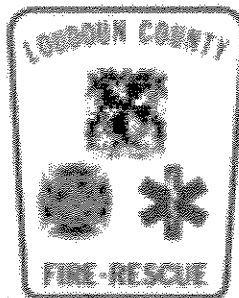

Proposed Service Plan

Loudoun County Fire and Rescue System



June 20, 2005

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Executive Summary

The Loudoun County Fire and Rescue System is pleased to present this *Service Plan* to the Loudoun County Board of Supervisors. The purpose of this *Service Plan* is to aid the Board in better understanding the current and long term needs of the County's combined fire and rescue system, and to recommend for Board consideration and adoption, levels of service from which resource requirements can be strategically established.

This proposed *Service Plan* was developed in concert with the combined fire and rescue system mission statement, system goals established by the Board of Supervisors, assessment of the organizational and operational structure of the system, review of the scope of services performed, input and guidance from County Administration and system (career and volunteer) leadership, and thorough analysis of essential information in the context of current and forecasted conditions that include:

- Volunteer and career staff recruitment and retention statistics and trends, in conjunction with anticipated system staffing needs.
- Countywide population trends and growth projections.
- Critical factors that can serve to influence and measure system effectiveness, to include the fire flashover "time-temperature curve", the American Heart Association's "Chain of Survival", National Fire Protection Association's (NFPA) Standard 1720, and performance benchmarking against regional fire-rescue systems.
- Locally established documents and policy directives that include Capital Intensity Factor Standards; the Loudoun County Comprehensive Plan; Loudoun County 2004 Growth Summary; Fire-Rescue Commission Charter, Bylaws, Fire-Rescue Guidelines (FRG's) and EMS Protocols; Capital Improvement Program and Capital Needs Assessment documents.

The plan provides background and rationale for recommendations reflecting "High," "Medium," and "Low" service levels, as well as current and optional service objectives that provide an end state "vision" to defined service levels. Additionally, the plan provides assessment of resource needs, costs, and impacts and outcomes for service level recommendations that include:

- Operating levels and standards that ensure effective and reliable performance.
- Current and future service areas that are predicative of population and demographic trends, land development forecasts, changing community risk and demand intensity for service.
- Operational staffing essential to achieve corresponding operating levels and standards.
- Facility and apparatus resources essential to achieve corresponding operating levels and standards, to include life-cycle replacement and renovation of capitalized assets necessary to maintain service levels with continuity.

The completion of this plan is intended to provide a positive guide for the Board of Supervisors in their decision-making processes in the near future.

Introduction

Purpose of the Service Plan

The purpose of the Combined Fire and Rescue System *Service Plan* is for the Loudoun County Board of Supervisors to better understand the current and long term needs of the combined Fire and Rescue System, and to adopt levels of service, which determine resource requirements for the System. The adopted service plan will help guide the Board of Supervisors to strategically plan for the current and future operations and physical plants for the Loudoun County Combined Fire and Rescue System.

Service Plan Implementation

This document will be reviewed by the Board of Supervisors Public Safety Standing Committee, and then will be transmitted to the Loudoun County Fire and Rescue Commission for their review and adoption on behalf of the combined fire and rescue system (17 independent volunteer companies and the Department of Fire and Rescue Services). Once adopted by the Fire and Rescue Commission, the *Service Plan* will be transmitted to the Board of Supervisors Public Safety and Finance/Government Services Standing Committees for endorsement prior to review and adoption by the Loudoun County Board of Supervisors. Once adopted by the Board of Supervisors, all future budgetary decisions pertaining to the combined fire and rescue system will be guided by the *Service Plan* until modifications are made in the future.

Table 1-Fire and Rescue Service Plan Timeline

COMBINED FIRE AND RESCUE SERVICE PLAN PROCESS AND TIMELINE FOR BOARD OF SUPERVISORS ADOPTION	
MILESTONE	DATE
Proposed Service Plan reviewed by the Board of Supervisors Public Safety Committee	June 20, 2005
Proposed Service Plan transmitted to the Loudoun County Fire and Rescue Commission (<i>Special Meeting</i>)	June 21, 2005
Proposed Service Plan reviewed by the Loudoun County Fire and Rescue Commission and the Volunteer Fire and Rescue Companies	June-August 2005
Proposed Service Plan Community/Volunteer Company Meetings (<i>Special Meetings</i>)	July-August 2005
Proposed Service Plan adopted by the Loudoun County Fire and Rescue Commission (<i>Special Meeting</i>)	Late August 2005
Proposed Service Plan adopted by the Fire and Rescue Commission transmitted, reviewed and endorsed by the Loudoun County Public Safety Committee (<i>Special Meeting</i>)	September 7, 2005
Proposed Service Plan transmitted, reviewed and endorsed by the Loudoun County Finance/Government Services Committee	September 20, 2005
Proposed Service Plan transmitted, reviewed and adopted by the Loudoun County Board of Supervisors	October 4, 2005
FY 2007 Budget and CIP Projects Based on Adopted Service Plan Prepared by the Combined Fire and Rescue System	October 2005-January 2006

Mission of the Combined System

Mission Statement

The combined Fire and Emergency Medical Services (EMS) system of Loudoun County provides residents and visitors with efficient and cost-effective fire protection, rescue and emergency medical services, and responds to and mitigates hazardous materials and related life safety and property threatening incidents utilizing state of the art equipment and a staff of highly-trained volunteer and career personnel located in strategically placed facilities 24 hours per day, seven days per week.

Board of Supervisors Established Goals

Protection of Life and Property

Provide cost-effective, equitable and responsive services to all citizens of Loudoun County, including adequate response times, effective fire and rescue incident supervision, adequate staffing, effective distribution of personnel and apparatus and timely adaptation to changing service needs. All organizations and participants comprising the fire, rescue and emergency medical system shall share responsibility for continuously improving their effectiveness and efficiency.

Volunteer Participation

Involve volunteers in decisions related to operations, procedures and guidelines through representation on the Fire and Emergency Medical Services Councils and the Fire and Rescue Commission. Promote continual improvement in the capabilities and job performance of volunteer members. Promote the highest caliber conduct of volunteer members.

Accountability

Maintain accountability to the Board and Loudoun County citizens for effective service delivery, sound management practices and the responsible use of public funds.

Operations and Administration

Maintain effective service delivery levels while minimizing associated costs of administrative overhead and operational expenses, including apparatus, facilities and equipment. Effectively manage volunteer resources, purchasing, maintenance, training and other programs.

Service Description

The combined system consists of the seventeen (17) volunteer Fire and Rescue companies, and the Department of Fire and Rescue Services (hereinafter referred to as “department”). Currently the Department of Fire and Rescue Services is divided into five divisions: EMS/Volunteer Coordination and Support; Field Services (Operations); Fire Marshal’s Office; Emergency Communications; Planning and Administration.

The Department provides supplemental operational staffing and administrative support to the County’s volunteer fire and rescue companies, and the Fire and Rescue Commission. In addition, the Department of Fire and Rescue Services maintains the County’s Fire and Rescue Emergency Communications Center, coordinates Emergency Management functions and related disaster services, special events planning, strategic planning and GIS/mapping services, public education and risk reduction, and conducts all code-related fire inspections and investigates the causes and origins for fires, explosions and hazardous materials incidents.

Fire-Rescue Commission

The Loudoun County Fire and Rescue Commission is responsible for developing a combined fire, rescue, and emergency medical service system for the County. The Commission was designed to serve as the Board of Directors for the fire and rescue system, establishing the framework for development and improvement of the system. The Department is responsible for the day-to-day management and operation of the system in accordance with the Commission’s guidelines, and when applicable County policies and procedures. The Commission’s authority extends to career and volunteer emergency services personnel.

The Commission operates under the authority of the Board of Supervisors. The Commission has seven voting members, three representing volunteer rescue services, three representing volunteer fire services, and the Chief of the Department of Fire and Rescue Service. The County’s Operational Medical Director (OMD) and a member of the Board of Supervisors serve as non-voting members of the Commission.

The Commission has established an initial, hierarchical framework for the development and distribution of system administrative and operational policies and guidelines. The Commission’s principal decisions are documented as Fire and Rescue Guidelines or “FRG’s.” Operational medical policies and protocols are documented by the OMD as a part of this structure. Temporary policies, known as Fire and Rescue General Orders, are the final element of the framework. Each volunteer company and the Department are required to develop agency guidelines documenting any unique administrative and operational needs.

Basic service delivery goals and guidelines, establishment of the basic structure of the fire and rescue system, company administrative and financial requirements, and system personnel qualifications have been the focus of the Commission since May 2002.

EMS Advisory Council

The Loudoun County EMS Advisory Council, Inc. is a principle advisor to the Fire and Rescue Commission on emergency medical services and rescue matters (FRG 1.1.4).

The Fire and Rescue Commission delegated the following authority to the Loudoun County EMS Advisory Council, Inc.:

- Appointment of the Loudoun County Fire and Rescue System Operational Medical Director (OMD) and Assistant Medical Directors, as may be required.
- Appointment of delegates and alternate delegates to the Northern Virginia Regional Emergency Medical Services Council.
- Management and distribution of the local reimbursement portion of the Two-For-Life program funding.
- Development of local requirements for training of Loudoun County EMS providers.

The **Two-For-Life** program, as amended in 1990, stipulates that two additional dollars be charged and collected at the time of registration of each passenger vehicle, pickup and panel truck. The funds collected, pursuant to **Section 46.2-694, Code of Virginia**, shall be used only for emergency medical services. The law further states that the Department of Health shall return twenty-five percent (25%) of the registration fees collected to the locality wherein such vehicle is registered to provide funding for:

- Training of volunteer or salaried emergency medical service personnel of licensed, nonprofit emergency medical service agencies.
- Purchase of necessary equipment and supplies for licensed, nonprofit emergency medical service agencies.

The current year funding for Loudoun County is \$99,566.50

Fire Advisory Council

The Loudoun County Fire Council is a principle advisor to the Fire and Rescue Commission on fire suppression and hazardous materials matters (FRG 1.1.5).

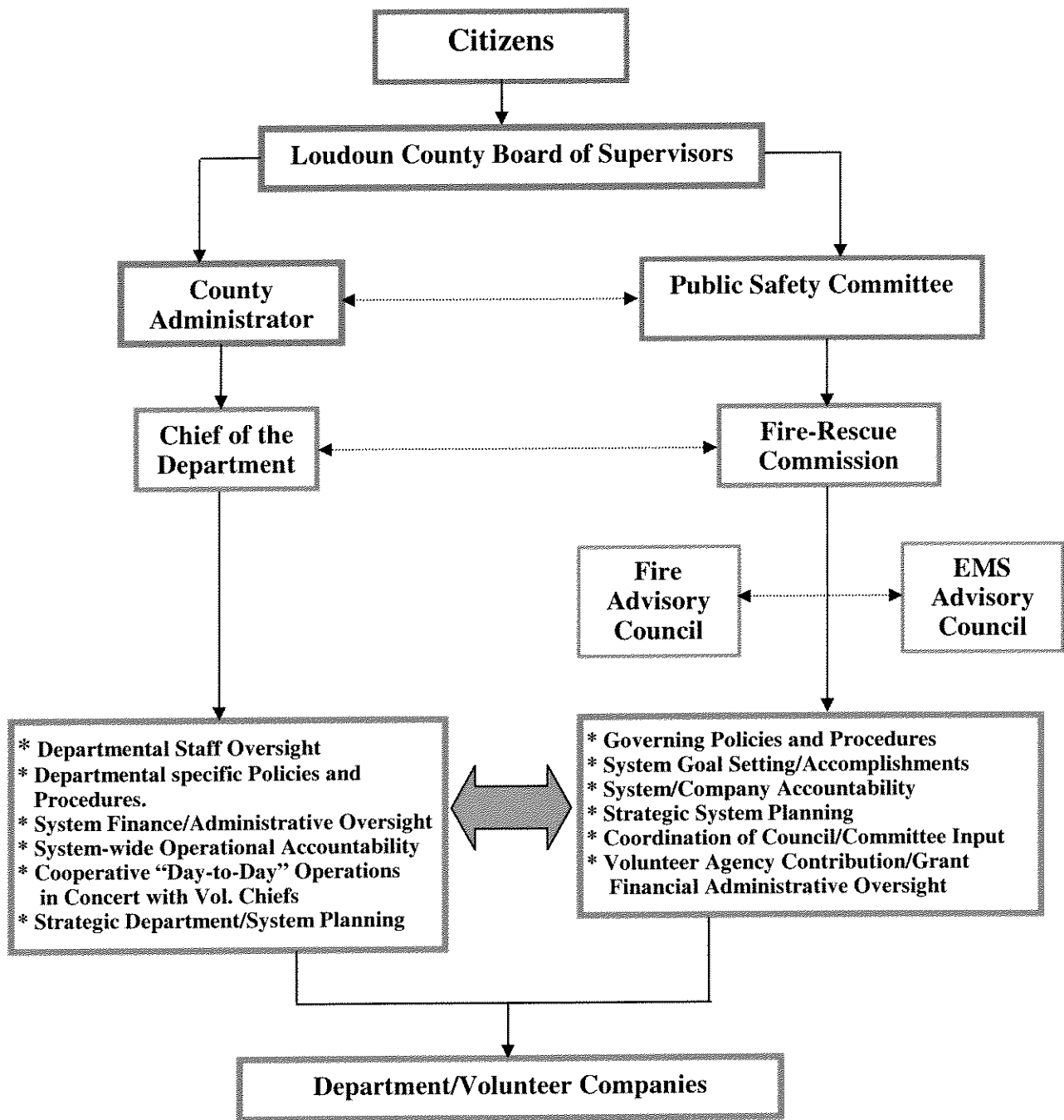
The Fire and Rescue Commission delegated the following authority to the Loudoun County Fire Advisory Council:

- Development of local requirements for training of Loudoun County firefighters and hazardous materials operations staff.
- Development and maintenance of a fire suppression and hazardous materials operations quality assurance program.
- Management and distribution of the County portion of Fire Programs funding.

The Virginia Fire Programs Fund is derived from one percent of fire-related insurance coverage. Approximately 75 percent of the total fund goes directly to counties, cities and incorporated towns within the Commonwealth as "Aid to Localities." The funds allocated, pursuant to **Section 38.2-401, Code of Virginia**, provides Virginia cities, towns and counties with funds to pay for training, construction of training centers, fire fighting equipment and protective clothing. Allocations are population-based.

The current year funding for Loudoun County is \$265,984.92

Figure 1- Combined System Organizational Structure^{1/2/3}



¹ The Loudoun County Board of Supervisors has ultimate authority over the bullets described under the Chief of the Department and the Fire and Rescue Commission. As such, guidelines and operations must be consistent with Board of Supervisors ordinances and policies.

² County Human Resources Policies and Procedures, and specific departmental policies and procedures govern career fire and rescue personnel. Fire and Rescue Guidelines describe broad goals and policies for the combined system to ensure consistent operational procedures and practices are employed.

³ Financial management is governed by County Management and Fiscal Policies and Procedures, Fire and Rescue Guidelines, as well as applicable policies and procedures promulgated by the Code of Virginia for specific grant funds.

Volunteer Companies

Loudoun County has a history of strong volunteer fire and rescue companies. Seventeen independent companies provide operational fire and rescue services. Currently the volunteer companies own all of the permanent operational fire and rescue stations and most of the apparatus and equipment, which includes fire pumpers, transport ambulances, ladder trucks, medium and heavy squad trucks, and other specialized equipment and apparatus.

Volunteer companies and members also support other activities to benefit their communities, including child safety seat installation/inspection, stand-by services at special events, and a variety of public education programs. Company activities also include fire apparatus maintenance and repair, station maintenance, self contained breathing apparatus testing and repair, fire and EMS training, as well as street and area mapping for emergency response.

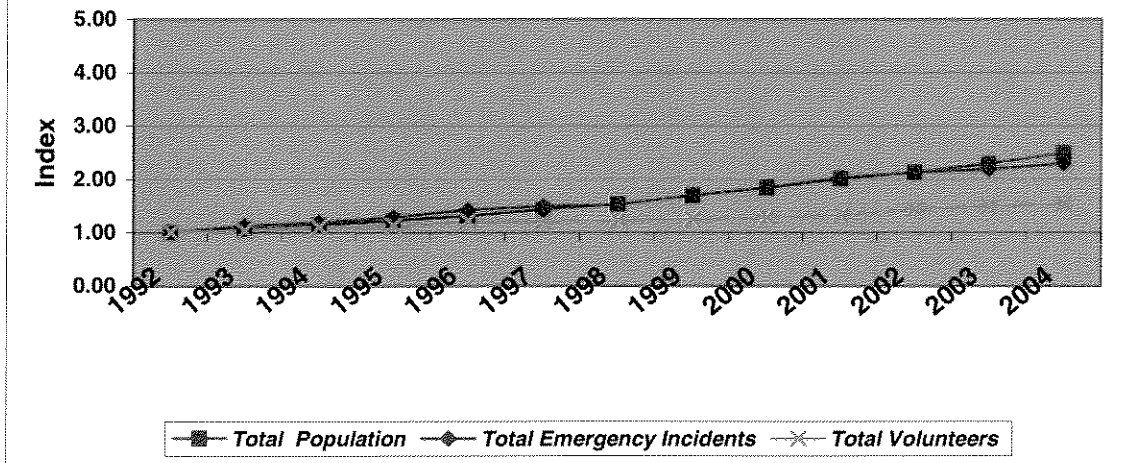
Table 2- Loudoun County Volunteer Fire and Rescue Organizations

LOUDOUN COUNTY VOLUNTEER FIRE AND RESCUE ORGANIZATIONS		
NUMBER	NAME	SUPPLEMENTAL CAREER STAFFING
1/20	Leesburg Volunteer Fire Company	Yes
2	Purcellville Volunteer Fire Company	Yes
3	Middleburg Volunteer Fire and Rescue Company	Yes
4	Round Hill Volunteer Fire and Rescue Company	Yes
5	Hamilton Volunteer Fire Company	Yes
6/23	Ashburn Volunteer Fire and Rescue Company	Yes
7	Aldie Volunteer Fire Company	Yes
8	Philomont Volunteer Fire Company	No
9/19	Arcola-Pleasant Valley Volunteer Fire and Rescue Company	Yes
10	Lucketts Volunteer Fire Company	Yes
11/18	Sterling Volunteer Fire Company	Yes
12	Lovettsville Volunteer Fire and Rescue Company	Yes
13	Loudoun Volunteer Rescue Squad	Yes
14	Purcellville Volunteer Rescue Squad	No
15/25	Sterling Park Volunteer Rescue Squad	No
16	Neersville Volunteer Fire Company	Yes
17	Hamilton Volunteer Rescue Squad	No

The volunteer component of the fire and rescue system is comprised of approximately 1337 volunteers (FY 04 aggregate⁴), and has grown at an average annual rate of 3% since FY 91. Loudoun County's estimated FY 04 population of 229,429 had an average annual increase of 255% for the same period. Volunteer members of the combined service will continue to work hand-in-hand with career personnel in existing and future stations through planned recruitment and retention efforts.

⁴ The total number of volunteers includes active (those that receive benefit points and respond to calls), and administrative members.

**Figure 2-Loudoun County Fire-Rescue System
Comparison of Call Volume, Population, Volunteers
FY 92 = 1.0**

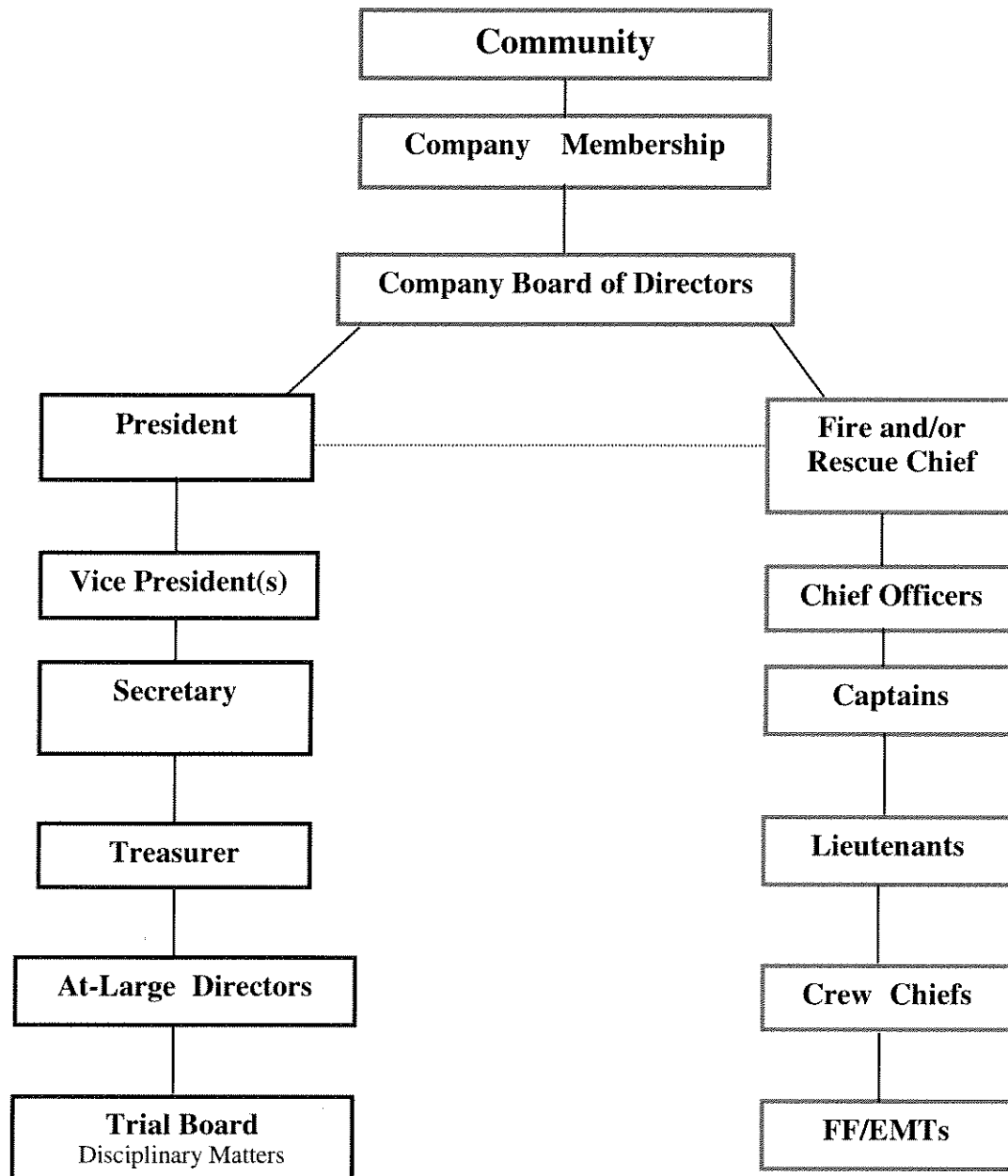


An aggressive volunteer recruitment program will bring more volunteers into the system. A recruitment and retention committee staffed by volunteer members and supported by career staff will continue to develop programs to enhance the existing recruitment and retention programs implemented by each volunteer company. Increasing fire and rescue staffing in all stations to meet service demands will require recruiting additional volunteers each year.

Recruitment and retention continues to present a variety of challenges for the volunteer agencies. During FY 04, 194 new volunteers entered the Fire-Rescue System, while 185 members left the system, resulting in a net gain of 9 volunteers. Time pressures including jobs, family, substantially increased training requirements, fund-raising demands, and increased call volume have had a measurable impact on retention. With the number of volunteers per 1,000 residents continuing to decrease, new programs and incentives have been implemented to retain and keep members involved in the fire and rescue system. The County's tuition reimbursement program was one of the many tangible benefits recently extended to volunteers; and efforts are underway to expand the Length of Service benefits. Current Volunteer benefits include:

- Length of Service Awards Program (LOSAP) Retirement Program
- Personal Property Tax Exemption (must have annual 80 points in LOSAP above)
- County/Town Vehicle Decal (must have annual 80 points in LOSAP above)
- Group Health, Dental & Vision Insurance (must be active for 6 or more months prior in order to be eligible for participation – volunteer pays monthly premium)
- Tuition Reimbursement (must have annual 80 points in LOSAP above for year of reimbursement)
- Worker's Compensation

Figure-3 Organizational Structure of a Typical Volunteer Company



Agencies are organized as 501 (c) 3 or 501 (c) 4 corporations in the Commonwealth of Virginia, and recognized by resolution of the Board of Supervisors.

Career Divisions/Programs

The Department of Fire and Rescue Services has grown considerably in recent years in order to address staffing requests in volunteer companies. The requests have been made in order to guarantee a fully efficient service delivery. These requests are the direct result of an increase in service demand on volunteer resources due to the explosive population growth the County is experiencing. Personnel growth has escalated from 56.5 FTEs in FY 93 to 378.64 FTEs in FY 06. Future service demands will require additional career personnel to provide weekend coverage in those stations where this staffing currently does not exist; and in some cases, the need to provide 24-hour coverage. Recruitment, training and retention of career firefighters and emergency medical technicians (EMT's) will continue to be a difficult challenge in the competitive regional employment market.

1. Emergency Medical Services/Volunteer Coordination and Support

This Division provides professional and technical oversight for Emergency Medical Services in conjunction with the Office of the Medical Director (OMD) to include the Department and volunteer agencies. The program ensures compliance with the regulations of the Virginia Department of Health, Office of Emergency Medical Services, which is provided for under Virginia Code, Title 32.1. The regulations establish standards to include staffing, training, equipment, medical direction and quality assurance. Additionally, the Division manages system-wide public education programs, and the blood borne pathogen/infection control programs.

The Division provides staff support to the Fire and Rescue Commission, the EMS and Fire Councils, and the Volunteer Retention and Recruitment Committee, which develop new programs to enhance the combination (volunteer and career) system. Volunteer Coordination and Support oversees and supports volunteer personnel through recruitment, referrals, and the development of retention incentive programs.

Public Education activities include coordination of all Department public education initiatives, and collaboration with other public and private sector partners in community safety education.

The system-wide blood borne pathogen/infection control program ensures training and compliance with OSHA 1910.1030 for emergency response system members.

2. Field Services

This division ensures the timely and effective response to and mitigation of fire, rescue, hazardous materials and emergency medical incidents within the County. More than 220 members of the department in conjunction with over 900⁵ plus members of the County's volunteer fire and rescue companies provide emergency response services. In addition, these personnel provide a variety of educational programs and other services to the County's citizens, businesses, visitors and other County agencies. Personnel assigned to the division respond to all types of emergency incidents 24 hours per day, seven days per week.

⁵ 918 volunteer members responded to calls between November 1, 2003 and October 31, 2004 (last points award period). Table 14 information.

The majority of Department employees are assigned to a daytime 12-hour work schedule (6:00 a.m. to 6:00 p.m.) in 16 of the 19 volunteer stations, seven days a week. The department also provides 24-hour/seven-day coverage for one station (engine and ambulance-South Riding), and three other stations for EMS service (Ashburn, Lucketts, Loudoun Rescue). The FY06 budget will allow additional 24-hour/seven-day engine/ambulance coverage in the Aldie station, and 24-hour/seven-day engine coverage in the Neersville station. Career staff is assigned to volunteer stations at the request of the volunteer companies, usually in response to daytime coverage deficiencies and/or increases in services and call volume.

Demands on the County's fire and rescue system increase as the population grows. Emergency call volume is up, with 16,693 incidents dispatched during FY 00 compared with 20,379 incidents during FY 04. The construction of campus-like facilities, high-rise housing facilities, assisted living facilities, and other large warehouse facilities has created different types of potential hazards, and new demands for proactive inspections. Increased non-residential development promises in-kind impacts on daytime demand intensity, as well as increased incidence of construction-related accidents and service delivery challenges associated with traffic congestion during peak commute periods. The system must now be able to handle not only rural hazards, but urban hazards as well.

In addition to its primary mission of emergency response, the Division supports other activities to benefit the community, including child safety seat installation/inspection, public education programs in the County schools, as well as tactical planning, fire prevention inspections, and the lock box program for commercial, government and multi-family occupancies. Members in the Division are also involved in performing fire apparatus minor maintenance and repair, minor fire station maintenance, self contained breathing apparatus testing and repair, as well as street and area mapping for emergency response.

3. Fire Marshal's Office

This Division seeks to provide a safe working and living environment for residents, workers and travelers within Loudoun County. Through effective enforcement of the Loudoun County Fire Prevention Code, as well as timely investigative actions as required by the Code of Virginia, incidents involving fire, explosive materials and hazardous materials are prevented or efficiently brought to a closure by a competent and well trained professional staff.

Pursuant to the Code of Virginia (§27-31 through §27-37.1) the Loudoun County Fire Marshal's Office is responsible for the investigation of all fires, explosions, hazardous material incidents and environmental crimes. The Division also regulates commercial blasting and is responsible to mitigate emergency situations involving explosives and hazardous devices, as required under local, state, and federal law. In addition to these activities, the Fire Marshal's Office is responsible for fire and life safety inspections of all businesses and multi-family occupancies in Loudoun County.

The Division is organized into two sections. The Code Enforcement/Explosives and Hazardous Devices (EHD) section is responsible for regular code enforcement activity, and daily operation of the Explosives and Hazardous Devices Team. The Investigations

section has primary investigation responsibility for fires, explosions, and related incidents. The Division operates three specialized canine units, one for accelerant detection (arson) one for explosives detection, and one for scent trailing.

4. Emergency Communications⁶

This program serves as the Public Service Answering Point (PSAP) for fire, rescue and law enforcement incidents using the County's enhanced 9-1-1 (E-9-1-1) system. Emergency and non-emergency fire and rescue calls are processed and the appropriate fire and/or rescue apparatus are dispatched to respond to the situation. Police related calls are received and transferred to the appropriate law enforcement agency. This division is also charged with the following:

- Ensuring the integrity of the Computer Aided Dispatch (CAD) data
- All public safety GIS data
- Maintenance of department vehicles
- Maintenance/procurement of mobile radio equipment.

Emergency Communications Center

The Emergency Communications Center operates 24 hours per day. Each shift includes dispatchers who are trained in emergency medical dispatch procedures. It is not unusual for dispatchers to be called upon to provide medical instructions prior to emergency personnel arriving at the scene.

With the proliferation of cellular phones there has been a marked increase in the number of calls made to the Emergency Communications Center. It is not unusual for a single incident to generate as many as 30 calls. As of FY04 cellular calls account for 39 percent of the emergency phone calls handled by the center. Dispatch operations are assisted by the County's CAD. The CAD system provides dispatchers with location information on landline calls, and provides constant updates on the status of units sent to the scene. Maintaining an accurate database is essential to the proper operation of the CAD system.

Emergency Management

The County's emergency management program includes a comprehensive planning approach to "all-hazards" emergencies. Planning focuses on countywide coordination, response, and remediation of natural and man-made disasters. Given the location of the County's close proximity to the Metropolitan Washington, DC area, advance planning and training are needed for a variety of potential crises. Pre-planning is an essential component of the County's ability to handle threats to public health and safety. Emergency Management also plays a key role as a member of the Special Events Planning Committee, assisting event organizers to plan for a safe and successful event, while minimizing the impact the event will have on the surrounding communities.

⁶ Emergency Management is a budget component of this division. This section is under the supervision of the Chief of the Department of Fire and Rescue.

5. Planning, Administration and Training

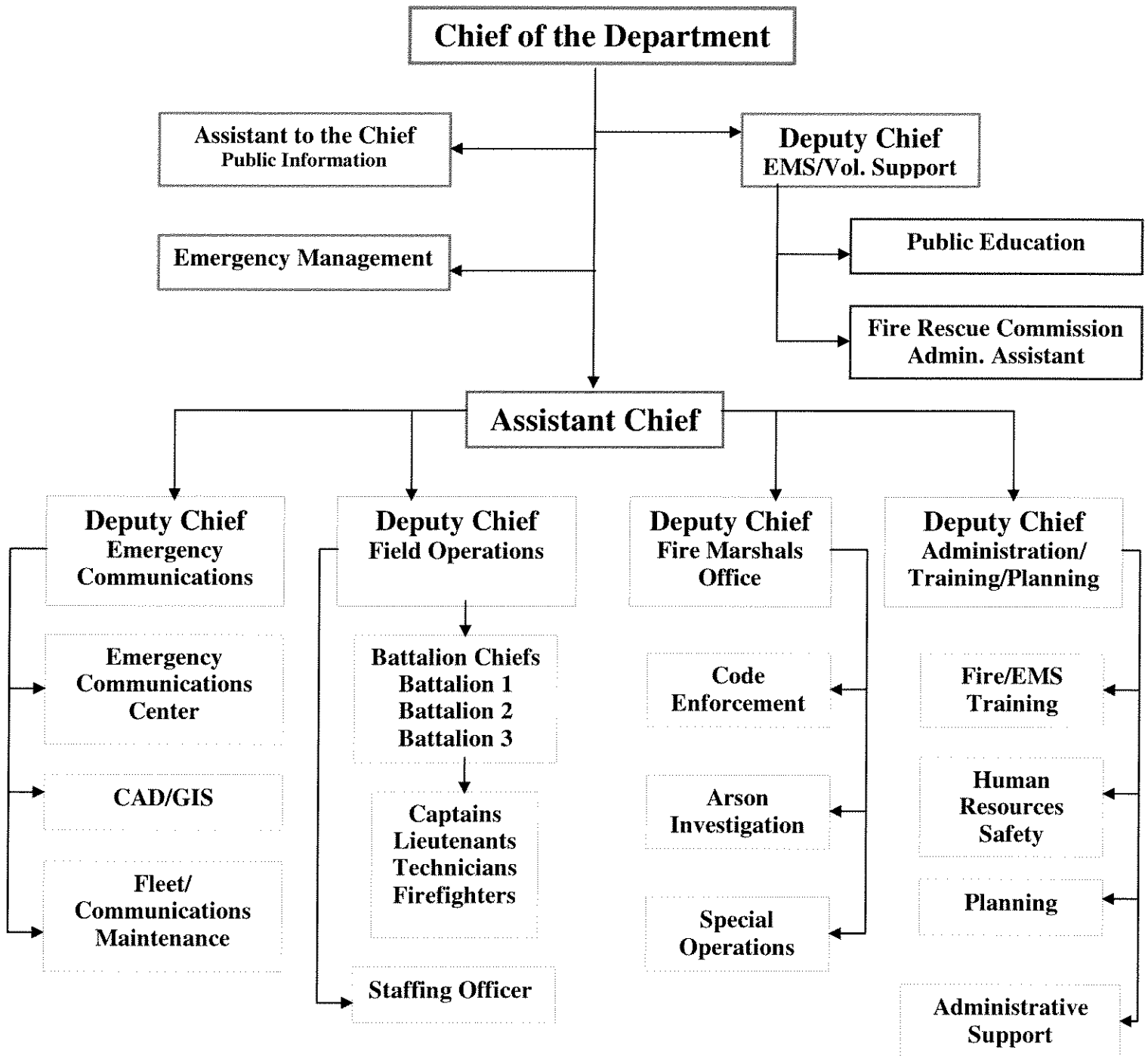
This Division is comprised of four functional areas. *Human resources* provides liaison to the County Human Resources office, counsel to senior staff regarding personnel actions, hiring and promotional processes, career development initiatives, payroll and leave, development and implementation of departmental human resource practices, staffing needs assessment and deployment, and safety program management. *Planning* performs strategic risk/trend analysis, development application referrals and plans review, and management of Departmental capital construction projects/vehicles and procurements. *Administrative Support* provides procurement, inventory control/supply distribution, and administrative support to the Department. *Training* provides and is committed to maintaining a sufficient roster of trained fire-rescue personnel through adequate facilities and other resources that meet service delivery goals and demands. This program provides comprehensive training in fire, rescue, emergency medicine, leadership, and management and facilitation of Departmental quality assurance and quality improvement.

Training

Training responsibilities include the coordination and delivery of EMS, fire, technical rescue, hazardous materials, and safety related training to all system personnel utilizing career and volunteer instructors. Volunteer companies also support training programs by providing fire and EMS apparatus and equipment for practical exercises. Training responsibilities also include professional development educational programs in areas such as leadership and instructional theory, and practices and facilitation of departmental quality assurance and quality improvement. This program provides liaisons to various local, regional, state and national work groups and committees, and coordinates special service-related programs.

As of FY05 the training section supports a career and volunteer staff of more than 850 qualified firefighters and EMTs, as well as more than 150 certified advanced life support technicians. The daily increase of large-scale corporate developments continues to present new fire fighting challenges requiring specialty training. Recurrent delivery of basic certification courses of three to six months duration each are required to ensure maintenance of adequate system staffing levels.

Figure 4- Loudoun County Department of Fire and Rescue Services
Organizational Structure (*June 2005*)



Drivers of the Fire and Rescue Service (Population, Response Goals, Staffing)

Population

The population of the County is one of three key drivers of the fire and rescue service. Demands on the fire and rescue system will continue to increase as the population continues to grow. Emergency call volume has increased from 16,693 incidents dispatched during FY 00 (population 169,599) to 20,379 incidents during FY 04 (population approx. 229,429) (Table 3). It is estimated that the population will grow from 247,293 in 2005 to 422,880 in 2020 (Table 4), a 58% increase for the period, which will directly impact the demand on the fire and rescue service. A direct link to the increase in population is the increase in the number of housing units throughout the County. It is estimated that the number of housing units for the fire and rescue service to protect will increase from 92,353 in 2005 to 159,140 in 2020 (Table 5), or a 58% increase for the period.

Table 3-Loudoun County Fire-Rescue Incident/Population Summary For FY 00 thru FY 04

<i>Fiscal Year</i>	<i>Emergency Incidents</i>			<i>Public Service Calls⁷</i>	<i>Total Incidents</i>	<i>Population</i>
	<i>Fire</i>	<i>EMS</i>	<i>Total</i>			
2000	4230	10633	14863	1830	16693	169,599
2001	4745	11647	16392	1862	18254	185,120
2002	4881	12300	17181	1216	18397	196,314
2003	4777	13165	17942	1000	18942	211,146
2004	5467	13819	19286	1093	20379	229,429

Table 4-Loudoun County Population Projections by Area

Year	2005	2010	2015	2020
Population	247,293	318,132	379,591	422,880
Eastern	158,885	201,873	236,489	262,347
Leesburg	48,905	65,344	81,218	91,263
Western	39,503	50,915	61,884	69,270

Table 5- Loudoun County Housing Unit Projections by Area

Year	2005	2010	2015	2020
Household Units	92,353	119,353	142,726	159,140
Eastern	59,182	76,143	89,880	100,007
Leesburg	18,275	24,376	30,257	33,982
Western	14,897	18,834	22,588	25,150

Notes:

- Eastern Loudoun includes the following planning sub areas: Ashburn, Dulles, Potomac, Sterling.
- Leesburg is the Leesburg planning sub area. This sub area is larger than the town boundaries.
- Western Loudoun includes the following planning sub areas: Route 15 North, Route 15 South, and Northwest, Route 7 West and Southwest.

Source: Departments of Economic Development, and Management and Financial Services (Tables 4, 5).

⁷ Non-emergency service calls (water leak, water in a basement, strange odor etc.)

Figure 5-Loudoun County Population Projections by Area

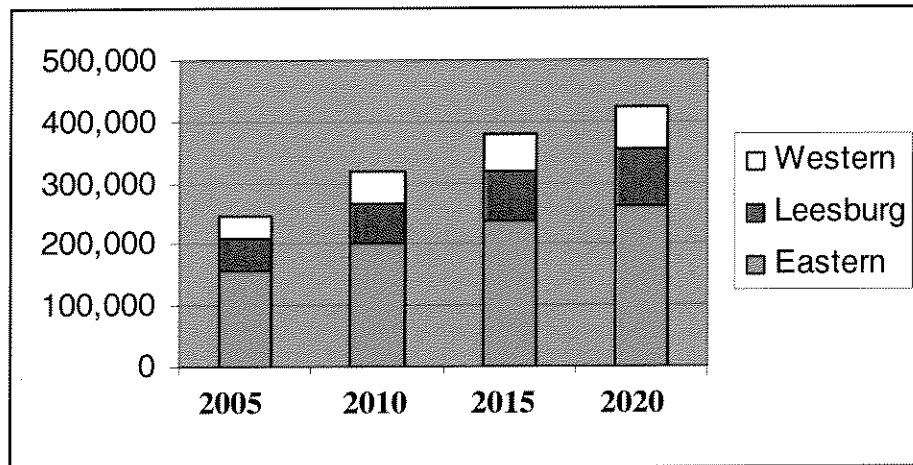
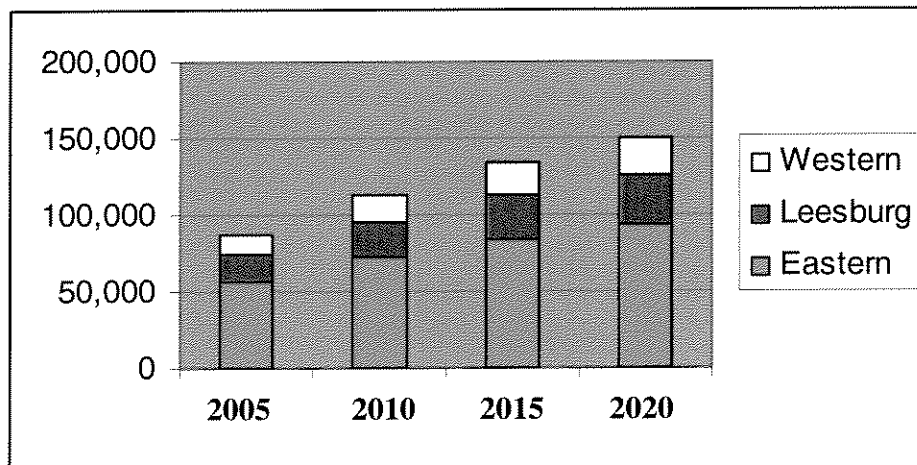


Figure 6- Loudoun County Housing Units Projections by Area



Notes:

- Eastern Loudoun includes the following planning sub areas: Ashburn, Dulles, Potomac, Sterling.
- Leesburg is the Leesburg planning sub area. This sub area is larger than the town boundaries.
- Western Loudoun includes the following planning sub areas: Route 15 North, Route 15 South, and Northwest, Route 7 West and Southwest.

Source: Departments of Economic Development, and Management and Financial Services.

Response Goals

The second key driver of the fire and rescue service is response goals. Response goals are critical to the planning process for fire and EMS agencies. There are accepted standards such as EMS survival rates from the American Heart Association, and Flashover Curves as indicated by the National Fire Protection Association (NFPA). These standards drive activities that must be performed within scientifically researched time frames in order to have a better outcome for the person or the property.

Rationale for EMS Response Goals

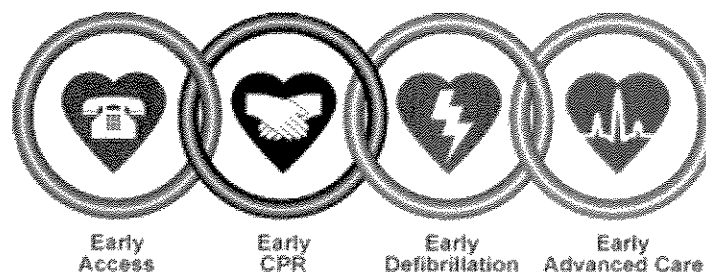
The American Heart Association Chain of Survival (Figure 7) outlines actions that must be taken in order to successfully resuscitate victims in an out-of-hospital cardiac arrest scenario. The initial consideration is how fast basic life support can be provided to citizens who suffer a cardiac arrest in Loudoun County. American Heart Association (AHA) studies have shown that cardio-pulmonary resuscitation (CPR) must begin immediately, and in all cases no later than **four to six minutes** of a cardiac arrest. Early defibrillation must then follow early CPR. According to the AHA, the chance for successful re-starting of the heart through defibrillation decreases by 10% for every minute past the initial cessation of the heart this intervention is not delivered.

Early access, early CPR, and early defibrillation must be followed by advanced life support (ALS) in order to provide advanced coronary care. The combination of late CPR (more than four minutes) and delayed advanced life support significantly decreases the chances for survival without complications.

An additional consideration is early ALS intervention for patients that are not yet in cardiac arrest, but have a cardiac rhythm that will become lethal if not treated rapidly. According to the American Heart Association, early advanced care provided by personnel trained and certified as ALS providers at the scene serves 3 primary purposes in the treatment of cardiac emergencies:

1. ALS intervention is designed to prevent cardiac arrest through the use of advanced airway management, administration of medications, and other ALS interventions.
2. ALS intervention includes therapies that may help resuscitate victims of cardiac arrest who are not in ventricular fibrillation (VF), or who are not responding to defibrillation.
3. ALS intervention can provide defibrillation if VF develops, and prevent refrillation and help stabilize the patient after resuscitation.

Figure 7- American Heart Association Chain of Survival

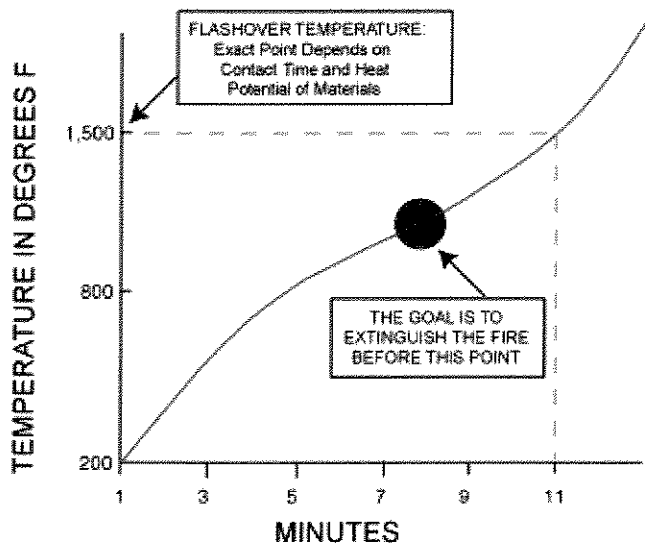


Rationale for Fire Suppression Response Goals

In order to have an aggressive fire suppression program, units must be able to apply water to a fire prior to the point of flashover. Flashover occurs anywhere from four (4) to eleven (11) minutes after the fire begins (Figure 8). This of course is dependent on the intensity of the fire and the materials that are burning within the structure. When the room bursts into flame, flashover has occurred.

Figure 8

Generalized Flashover Curve



Flashover is the point at which the contents a room or structure is heated to the point at which the contents of the room will all become consumed with flames. It is the end of an effective search and rescue in a room; it means the death of any person trapped in the blazing room—either civilians or firefighters. It signals the end of using a portable extinguisher to extinguish the fire; an attack hose-line is required after flashover occurs. It signals the end of the growth stage and that the fire is in the second stage of combustion—the fully developed stage. Finally, flashover signals the change from “contents” to a “structure fire.” This is the beginning of the collapse danger.

In order to intervene effectively in the fire scenario, fire suppression must begin prior to flashover, normally within approximately **eight minutes** after being dispatched. Once flashover occurs, fires expand exponentially, which means the fire will double every second after flashover has occurred. This fire expansion causes more property damage, creates less chance of civilian survival, and increases the potential for firefighter injuries. The response goal is to intervene prior to flashover occurring.

Current Loudoun County Fire and Rescue System Response Goals

The Loudoun County Fire and Rescue System Guideline (FRG) # 1.2, *Turnout and Response Times* (approved March 25, 2003) has established the following for system turnout and response goals:

Definitions:

- Turnout time- defined as the time from completion of the initial incident dispatch until the first appropriately staffed apparatus responds.
- Transit time-defined as the time from the initial response of the first appropriately staffed apparatus until arrival on the scene of the first emergency unit.
- Response time-the sum of the turnout time and the transit time.

Guideline Standards:

- Minimum Turnout Criteria
 - All dispatches for Basic Life Support (BLS) emergencies as defined by the Operational Medical Director (OMD):
5 minutes
 - All dispatches for Advanced Life Support (ALS) emergencies as defined by the Operational Medical Director (OMD):
3 minutes
 - All dispatches for fire or heavy rescue incidents:
6 minutes

FRG # 1.2 response time goal for all emergency incidents shall be: **30 minutes or less**⁸.

The Loudoun County Fire and Rescue System Guideline # 8.0.4.1 (approved June 24, 2003) has established the following that defines failure to meet the turnout standard on an emergency incident:

- The emergency incident is the first fire and/or EMS incident for the company.
- The company does not turnout within the times specified within FRG # 1.2.
- The company responds with staffing not meeting the requirements of FRG 1.2.1, Minimum Apparatus Staffing.

National Standard Response Goals

There are two national response guidelines that drive response goals for substantially all career, combination, and volunteer fire and rescue departments. NFPA standard 1710, *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* is the response goal standard for substantially all career departments. NFPA standard 1720, *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* is the response goal standard for volunteer and combination⁹ departments.

⁸ Response goal established to meet Virginia OEMS requirements. System goal is ≤ 8 minutes.

⁹ A department having emergency service personnel comprising less than 85 percent majority of either volunteer or career membership.

The Loudoun County fire and rescue system currently aligns with NFPA 1720. Table 6 defines the **minimum** response times/goals for NFPA 1720¹⁰.

Table 6- NFPA 1720 Response Goals

Demand Zone	Demographics	Staffing/Response Time	Achievement %
Special Risks	AHJ Determines	AHJ Determines ¹¹	90
Urban	>1000 people/mi.2	Staff-15/Response Time-9 minutes	90
Suburban	500-1000 people/mi.2	Staff-10/Response Time-10 minutes	80
Rural	<500 people/mi.2	Staff-6/Response Time-14 minutes	80
Remote	Travel distance \geq 8 mi.	Staff-4	90

* (Remote) Upon assembling the necessary resources at the emergency scene, the fire department should have the capability to safely commence an initial attack within two minutes.

High Operating Levels and Standards

The optimal response goal and turnout time service level is:

- Response time performance objectives equal to Table 6 for each demand zone.
- A performance objective of not less than 80% for the achievement of each minimum turnout criteria outlined in FRG # 1.2, *Turnout and Response Times*.

Companies achieving 60% to 79% over a ninety-day period shall be placed on dual response until 80% achievement is sustained for a period of thirty days. Failure to achieve 80% over the next thirty-day period will require the company President and Chief officers to provide the Fire and Rescue Commission a plan to resolve the turnout time issues for their company.

Companies achieving <59% over a thirty-day period shall be placed on immediate dual and response, and will require the company President and Chief officers to provide the Fire and Rescue Commission a plan to resolve the turnout time issues for their company. Failure to correct the turnout time issues for their company as specified by the Fire and Rescue Commission will result in immediate consideration for staffing enhancements to ensure service delivery.

Impacts and Outcomes if adopted

The high standard, if adopted, will provide fire suppression and emergency medical service delivery around the clock by the combined system meeting the achievement guidelines established in NFPA 1720.

¹⁰ NFPA 1720 combines staffing with response times as the measurement for response goals.

¹¹ The department (LCFR) is currently developing a Staffing and Deployment Standard of emergency services resources that will define Special Risk responses through a risk analysis of these occupancies.

Medium (Current) Operating Levels and Standards

The current response goal and turnout time service level is:

Table 7- Current system response goal and turnout time service level

Call Type	Minimum Turnout Time	Response Goal ¹²
EMS-Advanced Life Support Emergency:	≤3 minutes	≤ 30 minutes
EMS-Basic Life Support Emergency	≤5 minutes	≤ 30 minutes
Fire and Heavy Rescue Incident	≤6 minutes	≤ 30 minutes

Impacts and Outcomes if adopted

The medium standard if adopted will maintain fire suppression and emergency medical service deliver to the service level defined in FRG #1.2, and as indicated in Table 7.

Table 8- This response goal and turnout time service level is comparable to¹³:

Locality	Fire Response Goal	BLS Response Goal	ALS Response Goal
Henrico County, Virginia	≤5 minutes 90% achievement	≤5minutes First Responder <u>90 % achievement</u> ≤15 mins BLS Ambulance 90% achievement.	≤9 minutes First responder ALS <u>90 % achievement</u> ≤9 mins ALS Ambulance 90% achievement.
Chesterfield County, Virginia	≤6 minutes 90% achievement	≤6 minutes 90% achievement	≤6 minutes 90% achievement
Spotsylvania County, Virginia	≤8 minutes: Urban <u>80% achievement</u> ≤12 minutes: Rural 80% achievement	≤8 minutes: Urban <u>80% achievement</u> ≤12 minutes: Rural 80% achievement	≤8 minutes: Urban <u>80% achievement</u> ≤12 minutes: Rural 80% achievement
Howard County, Maryland	≤11 minutes: Metro <u>80% achievement</u> ≤14 minutes: Rural 80% achievement	≤10:30: Metro <u>80% achievement</u> ≤14 minutes: Rural 80% achievement	≤10:30: Metro <u>80% achievement</u> ≤14 minutes: Rural 80% achievement

¹² Response goal established to meet Virginia OEMS requirements. System goal is ≤ 8 minutes.

¹³ Response goals in this table include turnout times unless otherwise noted.

Service Areas

Meeting both population demands and response goals require that stations and services¹⁴ be strategically located throughout the County's 517 square miles of both suburban and rural composition. The original 17 fire and rescue stations are no longer able to provide timely response to areas of the County that have experienced, or are projected to experience growth in population and housing. This has required the County to provide temporary stations, as well as plan for future stations in order to reduce existing response times, and to meet the increased service demands as a result of this growth.

Current station locations (Figures 9 and 10) are based on historical needs of villages, communities, and incorporated towns where housing and population were, and remain today centralized. These stations became, and in many cases remain the center point in these communities. As indicated, an increase in growth in the County (74% between 2000 and 2004) and demand for services (82% between 2000 and 2004) has driven the need to add new and temporary stations, and increase fire and rescue services (Table 9)

Table 9- Increase in services-current

Service Increase	Year Opened
Ashburn-Ambulance	1992
Cascades Safety Center-Engine/Ambulance	1997
South Riding Station-Engine/Ambulance	2001
Moorefield Station-Engine/Ambulance	2004
Purcellville-Ladder Truck	2004
Lucketts-Ambulance	2005
Ashburn-Ladder Truck	2005

Future station locations and services will be driven by population, and the need to decrease response goals due to travel times. A Capital Intensity Factor criterion has been developed by the County's Fiscal Impact Committee to assist County agencies plan for future capital projects and acquisitions. Table 10 outlines how this criterion applies to the fire and rescue services. Figures 11 and 12 illustrate projected new station locations, and projected new service locations. Associated costs are included in the Facility/Vehicle needs section of the Service Plan.

Table 10-Fire and Rescue Services Capital Intensity Factors

Suburban Loudoun	Vehicle Type	Population Factor
Fire & Rescue	1500-gpm Engine	1:10,000 population
Fire & Rescue	ALS Ambulance	1:10,000 population
Fire & Rescue	Ladder Truck	1:25,000 population
Fire & Rescue	Heavy Rescue Squad	1:50,000 population
Rural Loudoun		
Fire & Rescue	1500-gpm Engine	1:10,000 population
Fire & Rescue	ALS Ambulance	1:10,000 population
Fire & Rescue	Tanker	1:10,000 population
Fire & Rescue	Brush Truck	1:10,000 population
Fire & Rescue	Heavy Rescue Squad	1:50,000 population
Fire & Rescue	Ladder Truck	1:25,000 population

¹⁴ Services include engines, ladders, heavy squads, ambulances, brush trucks, and tankers.

Figure 9- Current Fire Service Areas

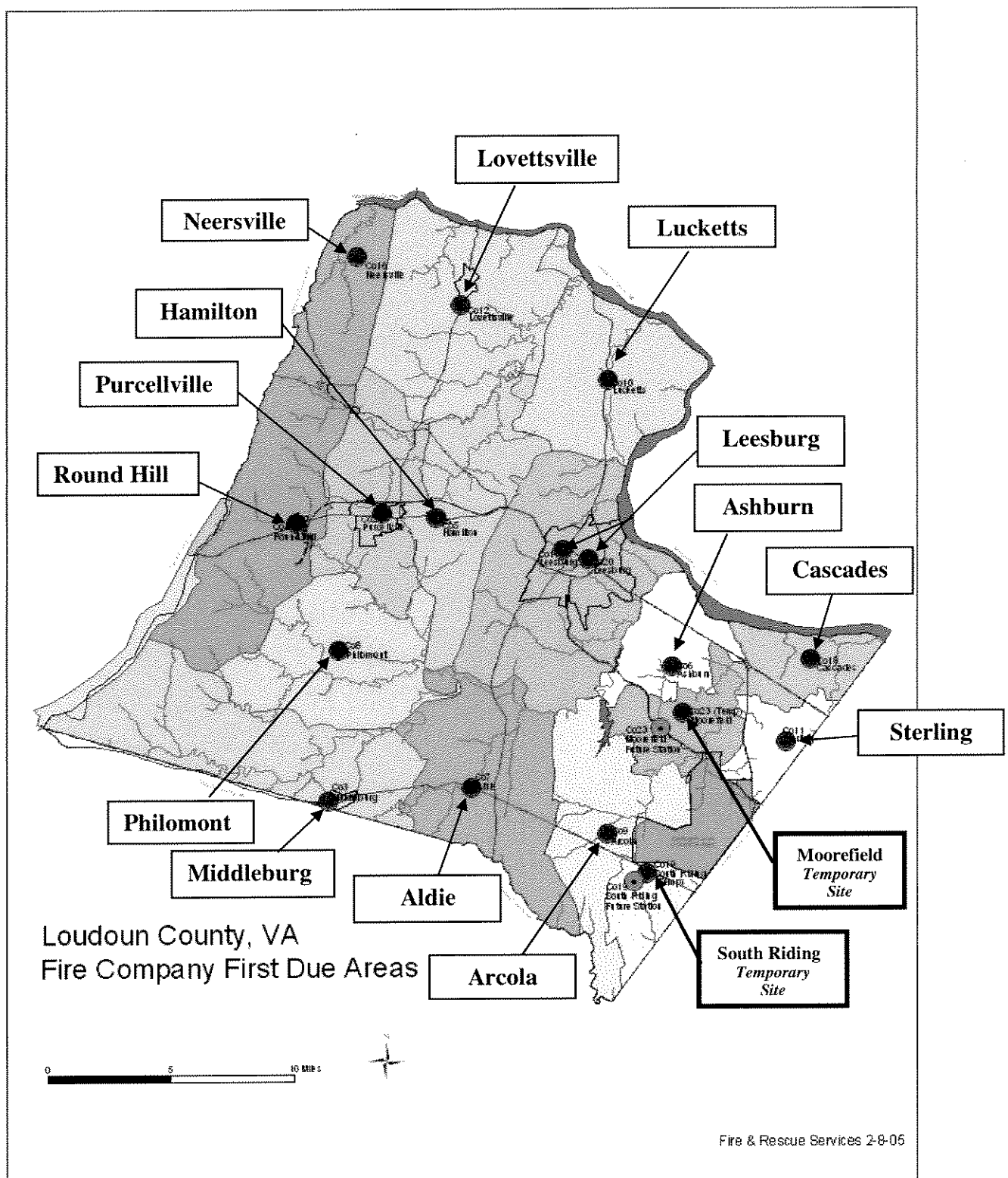


Figure 10- Current Rescue Areas

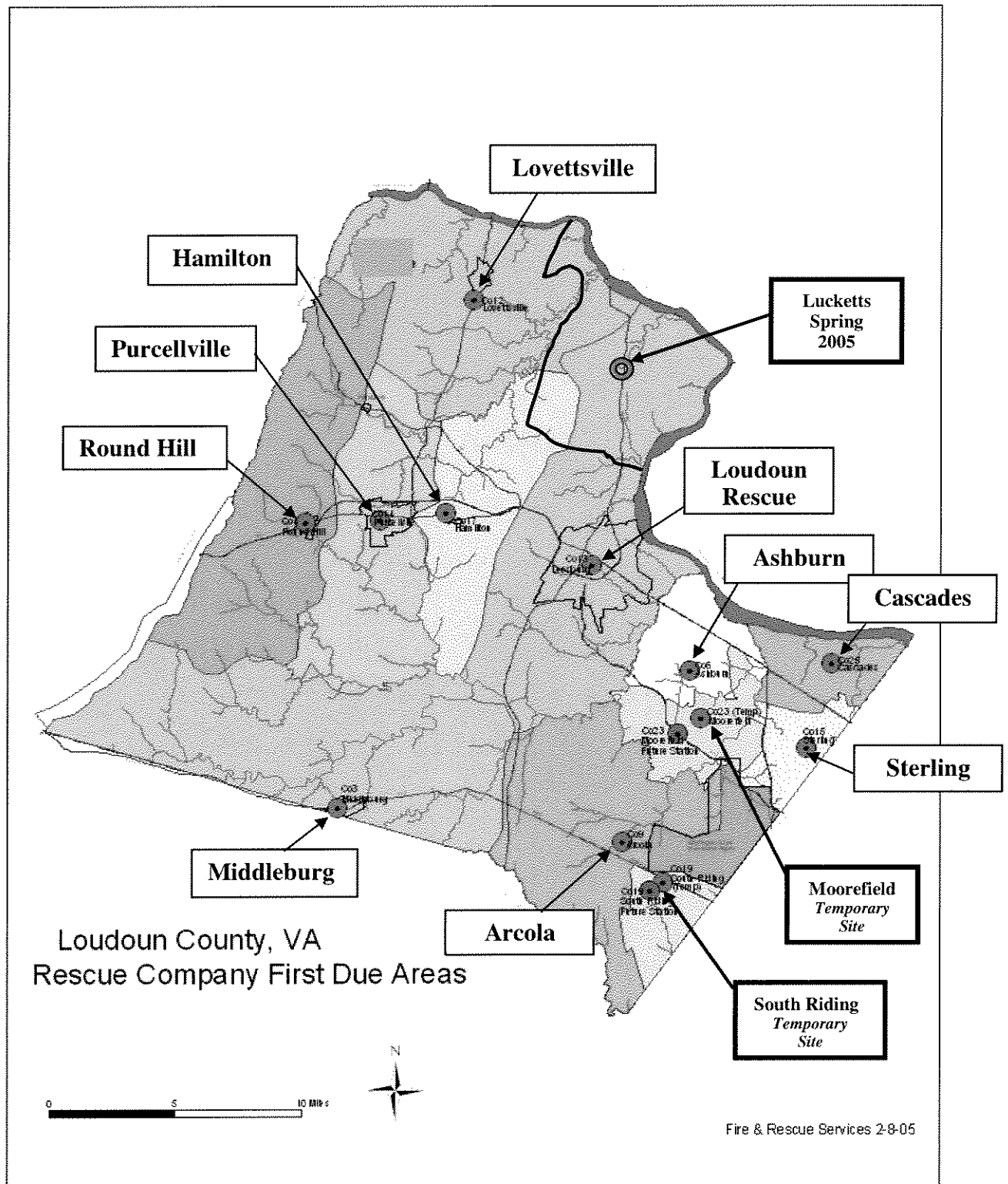
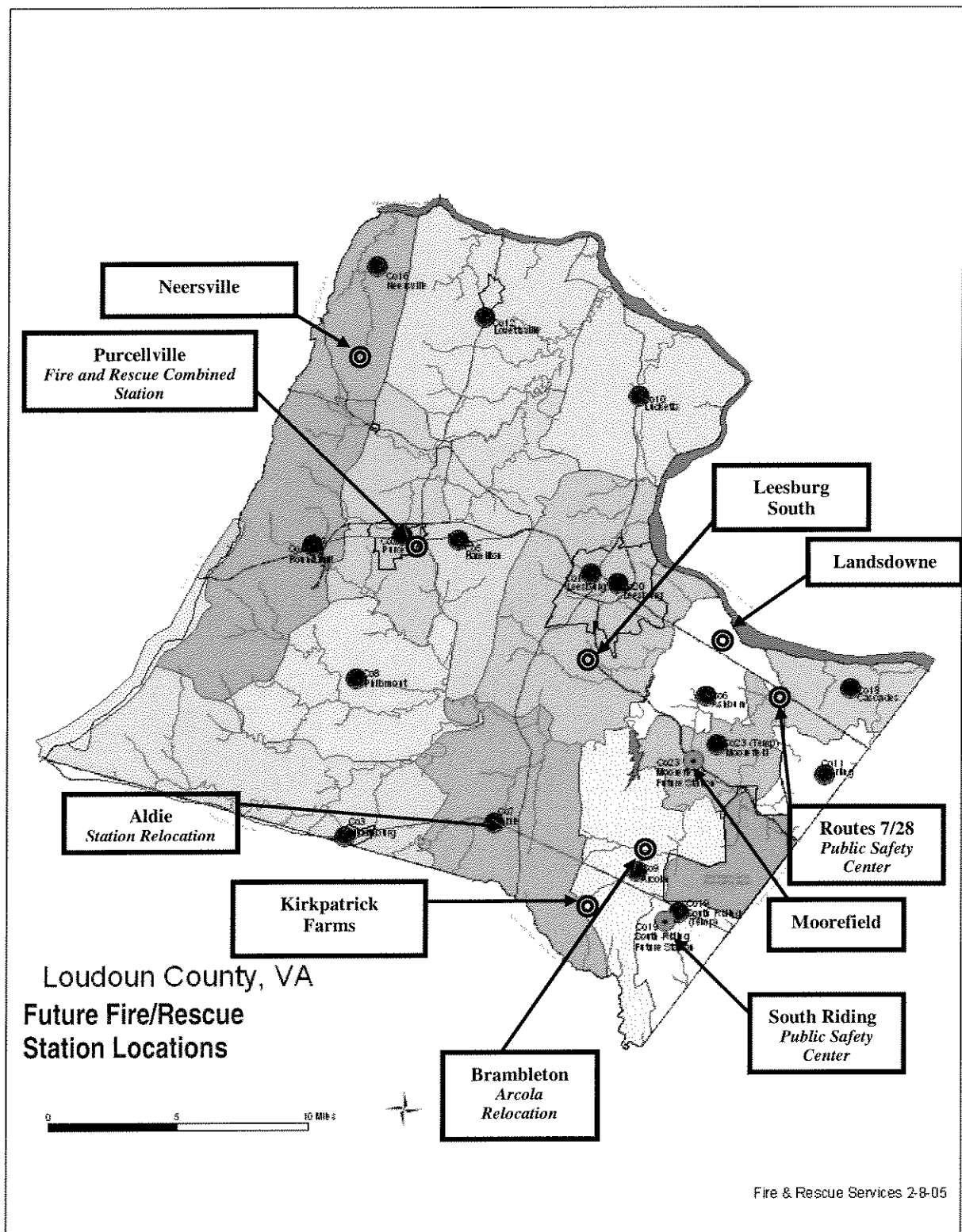
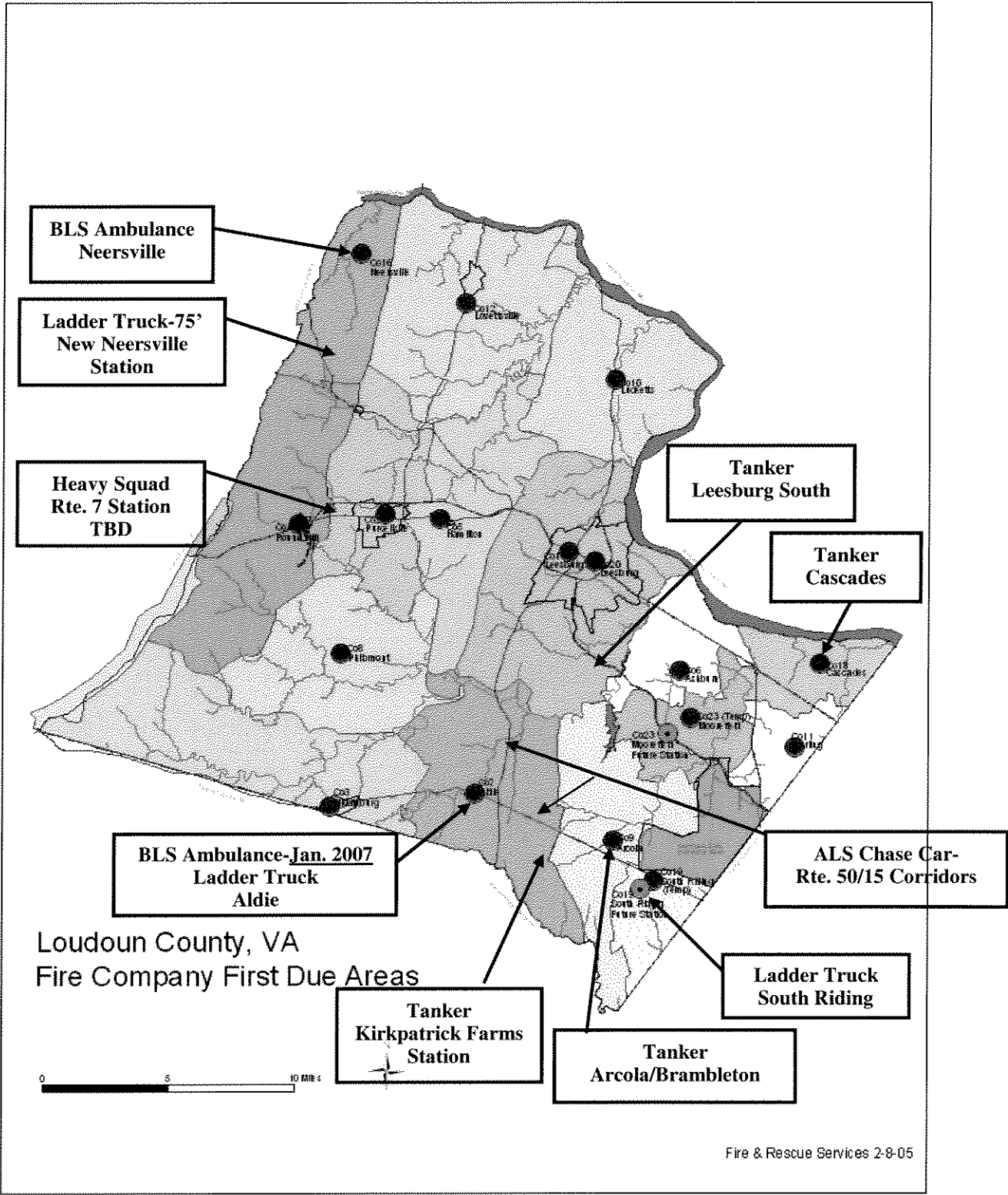


Figure 11-Future Fire/Rescue Station Locations/Service Areas¹⁵



¹⁵ Identified in FY 2005 CIP program budget.

Figure 12-Future Fire/Rescue Service (apparatus) Projections



Staffing

The third and final driver of the fire and rescue service is staffing, which has a direct link to response goals, as immediately available staffing significantly reduces turnout time, therefore reducing total response goals.

Current Staffing Levels

The combined system staffing levels are currently established by FRG 1.2.1 (revised/approved June 24, 2003) as follows:

Table 11- Minimum Apparatus Staffing Levels: Combined System

Apparatus Type	Minimum Staffing Level
Engine Companies	3
Ladder Companies	3
Heavy Squad Companies	3
Tanker Companies	1
Advanced Life Support Ambulance	2 ¹⁶
Basic Life Support Ambulance	2

Maintaining the service levels in this standard will require a combined effort from both the volunteer companies and the career department. Volunteers must be recruited and retained in order to deliver services to the community through a combined system. This will require a combination of several program areas administered by the Department to include the continuance of quality, flexible schedule training programs, administrative assistance through record keeping, a central application/orientation process, and an aggressive recruitment program. Failure to maintain and/or increase volunteer participation will have an impact on field services, as additional career firefighters will be required.

National Standard Staffing Levels

Determining service staffing levels prescribes the ability for the combined system to deliver service to its customers. In support of the system's mission statement, service delivery is based on the ability to place adequate numbers of personnel and equipment (companies¹⁷) on emergency scenes within established time frames (FRG #1.2/NFPA 1720).

NFPA 1720 recommends a **minimum** national standard for staffing fire suppression responses (Table 12). The primary emphasis of this staffing standard is to ensure emergency response is reliably and consistently delivered to each established demand zone, and to ensure that a sufficient number of members are available to operate safely and effectively.

¹⁶ Minimum staffing for a medic ambulance is one EMT-Basic, and one EMT-Intermediate or EMT-Paramedic released by the OMD. An ALS ambulance staffed with one EMT-Basic and one EMT-Enhanced released by the OMD is recognized as a Rescue ambulance.

¹⁷ Companies are defined in NFPA 1720 as a group of members under the direct supervision of an officer; trained and equipped to perform assigned tasks; usually organized as engine companies, ladder companies, squad companies, rescue companies, or multi-functional companies; usually operating with one piece of fire apparatus; arriving at the incident scene on apparatus.

Table 12: NFPA 1720 Staffing Standard¹⁸

Demand Zone	Demographics	Staffing¹⁹/Response Time	Achievement %
Special Risks	AHJ Determines	AHJ Determines ²⁰	90
Urban	>1000 people/mi.2	Staff-15/Response Time-9 minutes	90
Suburban	500-1000 people/mi.2	Staff-10/Response Time-10 minutes	80
Rural	<500 people/mi.2	Staff-6/Response Time-14 minutes	80
Remote	Travel distance \geq 8 mi.	Staff-4	90

* (Remote) Upon assembling the necessary resources at the emergency scene, the fire department should have the capability to safely commence an initial attack within two minutes.

Table 13-The staffing service level is comparable to:

Locality	Engine	Ladder	Tanker	Heavy Squad	BLS Ambulance	ALS Ambulance
Henrico County, Virginia	3	3	No data	3	2	2 Staffing requires 1 ALS Provider
Chesterfield County, Virginia	4 ²¹	3	No Data	No data	2	2 Staffing requires 1 ALS Provider
Prince William County, Virginia	3	3 ²²	1	3	2	2
Howard County, Maryland	3	4	2	4	2	2 Staffing requires 1 ALS Provider

¹⁸ Personnel responding to fires and other emergencies shall be organized into company units or response teams and shall have required apparatus and equipment.

¹⁹ Fire suppression response.

²⁰ The Department (LCFR) is currently developing a Staffing and Deployment Standard of emergency services resources that will define Special Risk responses through a risk analysis of these occupancies.

²¹ 8 stations staffed at 4, 10 stations staffed at 3.

²² Commencing enhancement plan to increase ladder and heavy squad staffing to 4.

High Operating Levels and Standards

This service level includes staffing for planned facilities in Lansdowne, Routes 7/28, Leesburg South, and Kirkpatrick Farms, and new service (Ladders/Heavy Squads)²³. This service level also includes one (1) additional career staff per each new Engine for the purpose of increasing the personnel pool to cover planned leave (annual/training etc.) and unplanned leave (sick etc.).

The optimal system service level is 162 personnel per day (Table 11 staffing level equivalents).

- 4 Battalion Chiefs (3 Fire/1 EMS)
- 38 Unit Officers-Captain or Lieutenant²⁴
- 46 Technicians/Apparatus Operators
- 35 Firefighters
- 33 Ambulance personnel
- 11 ALS personnel

Required combined system personnel to satisfy this standard:

137²⁵ total system-wide volunteer personnel required to staff evening hours (6:00 P.M.-6:00 A.M.), and daytime services not staffed by career personnel.

78 total career personnel required to staff daytime hours (6:00 A.M.-6:00 P.M.)

52 total career personnel required to staff 24/7 companies (6:00 A.M.-6:00 A.M.)

Ratio Volunteer to Career (daily staffing): 137/130

Ratio Volunteer to Career (total): 959/516

The high service standard would add an additional 4 Captains, 24 Lieutenants, 42 Technicians, 38 Firefighters, 26 Ambulance personnel, 2 ALS personnel.
Total first year cost of \$10,469,384; Total second year costs of \$8,767,512
Additional career personnel will be based on volunteer company requests for supplemental staffing. ***The high service level standard can only project staffing requirements per company, and not volunteer strength in active membership.***

Impacts and Outcomes if adopted

The high standard if adopted will provide personnel through the combined system to staff Engine Companies, Ladder Companies, Tanker Companies, Heavy Squad Companies, and Ambulance Companies in each station where these response units are located, for the prompt initiation of fire suppression and emergency medical service delivery around the clock meeting the recommendation in NFPA 1720.

²³ Lansdowne, Leesburg South, Kirkpatrick Farms: 24/7 staffing. Routes 7/28 staffing: 7/12. New services include Ladder Companies at Aldie and Neersville: 24/7 staffing; Heavy Squad-Rte 7:24/7 staffing; 1 additional company: 24/7; 2 additional companies: 7/12 staffing.

²⁴ Five officers are also counted as ALS providers (career staffed ambulances).

²⁵ Utilizing one (1) twelve (12) hour shift per week per volunteer, a total of 959 certified and active volunteers would be required to maintain the high standard.

Medium Operating Levels and Standards

This service level includes a moderate increase in 7/12 and 24/7 career staffing above the current standard for planning purposes should those enhancements be needed to supplement volunteer staffing²⁶. This service level also includes one (1) additional career staff per Engine staffed for the purpose of establishing a personnel pool to cover planned leave (annual/training etc.) and un-planned leave (sick etc.).

The medium service level is 124 personnel per day (Table 11 staffing levels).

- 4 Battalion Chiefs (3 Fire/1 EMS)
- 30 Unit Officers-Captain or Lieutenant²⁷
- 34 Technicians/Apparatus Operators
- 27 Firefighters
- 25 Ambulance personnel
- 9 ALS personnel

125²⁸ total system-wide volunteer personnel required to staff evening hours (6:00 P.M.-6:00 A.M.) and daytime services not staffed by career personnel.

63 total career personnel required to staff daytime hours (6:00 A.M.-6:00 P.M.)

29 total career personnel required to staff 24/7 companies (6:00 A.M.–6:00 A.M.)

Ratio Volunteer to Career (daily staffing): 125/92

Ratio Volunteer to Career (total): 875/364

The medium service standard would increase 1 Battalion Chief to 24-hour coverage, and add 10 Lieutenants, 10 Technicians, 34 Firefighters, 8 Ambulance personnel.

Total first year cost of \$4,735,616 Total second year costs of \$3,939,842

Additional career personnel will be based on volunteer company requests for supplemental staffing. ***The medium service level standard can only project staffing requirements per company, and not volunteer strength in active membership.***

Impacts and Outcomes if adopted

The medium standard if adopted will provide personnel through the combined system to staff Engine Companies, Ladder Companies, Tanker Companies, Heavy Squad Companies, and Ambulance Companies in each station where these response units are located, for the prompt initiation of fire suppression and emergency medical service delivery around the clock meeting the achievement recommended in NFPA 1720.

²⁶ South Riding Ladder: 24/7 staffing; Neersville BLS Ambulance: 24/7 staffing; 3 additional companies: 24/7 staffing; 2 additional companies: 7/12 staffing.

²⁷ Five officers are also counted as ALS providers (career staffed ambulances).

²⁸ Utilizing one (1) twelve (12) hour shift per week per volunteer, a total of 875 certified and active volunteers would be required to maintain the current standard.

Current Operating Levels and Standards

The current service level is 118 personnel per day (Table 11 staffing levels).

- 4 Battalion Chiefs (3 Fire/1 EMS)
- 29 Unit Officers-Captain or Lieutenant²⁹
- 32 Technicians/Apparatus Operators
- 26 Firefighters
- 23 Ambulance personnel
- 9 ALS personnel

125³⁰ total system-wide volunteer personnel required to staff evening hours (6:00 P.M.-6:00 A.M.), and daytime services not staffed by career personnel.

63 total career personnel required to staff daytime hours (6:00 A.M.-6:00 P.M.)

23 total career personnel required to staff 24/7 companies (6:00 A.M.-6:00 A.M.)

Ratio Volunteer to Career (daily staffing): 125/86

Ratio Volunteer to Career (total): 875/293

Table 14- Total Incidents Responded to by Volunteers Eligible to Earn Points
November 1, 2003 thru October 31, 2004³¹

Total Incidents Responded To	Volunteers Earned Points		Volunteers Running Calls		Cumulative Totals	
	NO	YES	Total	%	Total	%
<1	462	53	515	35.94%	515	35.94%
1-50	247	229	476	33.22%	991	69.16%
51-100	49	174	223	15.56%	1214	84.72%
101-150 ³²	12	109	121	8.44%	1335	93.16%
151-200	3	51	54	3.77%	1389	96.93%
201-250		24	24	1.67%	1413	98.60%
251-300		14	14	0.98%	1427	99.58%
301-350		2	2	0.14%	1429	99.72%
351-400		2	2	0.14%	1431	99.86%
451-500		1	1	0.07%	1432	99.93%
501-550		1	1	0.07%	1433	100.00%
Grand Total	773	660	1433	100.00%		

²⁹ Five officers are also counted as ALS providers.

³⁰ Utilizing one (1) twelve (12) hour shift per week per volunteer, a total of 875 certified and active volunteers would be required to maintain the current standard.

³¹ Not all volunteer member responses are currently captured in this report, as some are not interested in participating in LOSAP.

³² 15.28% (219) of the total reported volunteer membership running calls ran 101 or more calls.

The cost for the current operating standard is:

Program Financial Summary	FY 02 Actual	FY 03 Actual	FY 04 Actual	FY 05 Adopted	FY 06 Adopted
Expenditures					
Personnel	\$7,483,735	\$9,547,081	\$11,797,231	13,729,000	17,074,000
Operations & Maintenance	627,424	681,765	1,078,923	1,208,000	1,695,000
Capital Outlay	63,031	70,507	385,730	230,000	15,000
Central Vehicle Fund	0	0	3,384	0	0
Total Expenditures:	\$8,174,190	\$10,299,353	\$13,265,268	\$15,167,000	\$18,784,000
FTE Summary:	150.62	187.17	228.36	247.47	292.71

Impacts and Outcomes if adopted

The current standard as adopted provides personnel through the combined system to staff Engine Companies, Ladder Companies, Tanker Companies, Heavy Squad Companies, and Ambulance Companies in each station where these response units are located, for the prompt initiation of fire suppression and emergency medical service delivery around the clock meeting the achievement standard established in FRG # 1.2.

Volunteer Staffing Value

As already noted, maintaining the service levels in the staffing standards (High, Medium, Current) will require a mutual effort from both the volunteer companies and the career department. Volunteers must be vigorously recruited and retained in order to deliver services to the community through a combined system. The recruitment of volunteer staff not only delivers fire and rescue services to the community through the combined system, but also reduces personnel costs to the Department's annual budget.

On March 24, 2005, Independent Sector³³ announced that the 2004 estimate for the value of a volunteer hour is \$17.55 per hour. Based on the volunteer to career staffing ratios for each standard to staff Engine Companies, Ladder Companies, Tanker Companies, Heavy Squad Companies, and Ambulance Companies in each station where these response units are located, the following quantifies the value volunteer staffing provides:

High Standard: 959 x 12 hours per week x 52 weeks x \$17.55 per hour = \$10,502,200

Medium Standard: 875 x 12 hours per week x 52 weeks x \$17.55 per hour = \$9,582,300

Current Standard: 875 x 12 hours per week x 52 weeks x \$17.55 per hour = \$9,582,300

³³ Independent Sector is a Washington, D.C based nonprofit, nonpartisan coalition of national organizations, foundations and corporate philanthropy programs.

Facilities/Vehicle Needs

New Stations

This service plan outlines the planned architectural, engineering, and construction of ten stations over the next five to ten years, as well as the planning and implementation for existing station renovations. The 2005-2010 Capital Improvement Program (CIP) plan outlines a method for this service expansion and renovation in terms of projects and funding. Based on community development, population growth, and existing station needs, construction and CIP time schedules are re-evaluated annually. During the FY 06 budget process, the Western Loudoun station project was re-programmed in the CIP to meet the service demand needs in the Neersville response areas. An additional CIP project has been added to construct a station in Purcellville for both fire and rescue companies, as both facilities are in need of replacement. The Aldie station has been included in the CIP program due to its proximity to a floodplain that results in facility flooding, and the need to relocate due to current and projected future service demands.

Table 15- Fire and Rescue Station Construction Schedule

Project	Proposed Start of Project	Projected Cost FY06 \$
South Riding Public Safety	---In Progress---	5,986,000 2
Moorefield Fire/Rescue	---In Progress---	5,340,000 2
Dulles/Rte. 28 Public Safety	---In Progress---	7,905,000 3
Purcellville Fire/Rescue Station	---In Progress---	9,130,000 3
Brambleton Fire Public Safety	---In Progress---	8,130,000 2
Lansdowne Fire Public Safety	FY 2006	6,695,000 2
Aldie Fire/Rescue	FY 2007*	7,250,000 1
Neersville Fire/Rescue	FY 2009	7,878,000 3
Leesburg South Fire	Future FYs	8,515,000 3
Kirkpatrick Farms	Future FYs	8,515,000 3

Source of Table: Loudoun County proposed FY 06 CIP budget pages.

1-Aldie land acquisition scheduled for FY 06 utilizing land acquisition fund.

2-Proffered land site.

3-Land acquisition required.³⁴

Impacts and Outcomes if adopted

By adopting this CIP program for new station construction, fire suppression and EMS apparatus and equipment will continue to be strategically placed throughout the County for the prompt initiation of fire suppression and emergency medical service delivery around the clock meeting adopted response goal and staffing achievement standards.

³⁴ The Department is actively pursuing proffer sites for the Leesburg South and Kirkpatrick Farms projects.

Station Renovations

The station renovation project funding has been allocated in the CIP plan over the next five years to allow for improvement to volunteer owned fire and rescue stations. Renovations in FY 06 will be focused on repairing and renovating selected facilities to meet life-safety and the most critical facility needs.

An engineering study was funded in FY 04 to complete a structural assessment of volunteer stations and determine the scope and projected cost of work. That study, to be completed in late FY 05 will provide more accurate cost estimates and actual work to be completed for the FY 07-10 capital plan.

FY 07 thru FY10 includes funding to increase the capabilities of stations to effectively house fire and EMS personnel who may be on stand-by 24 hours per day, and represents an estimate of the potential costs to renovate 128,254 square feet of existing buildings (interior renovation work).

Funding for the station renovation project is derived from local tax funding in FY 06. Station renovation projects will be financed through a combination of lease purchase bonds, local tax funds, and revolving loan funds. Financing will depend upon variables such as ownership, the ability to pay, and the ability to manage portions of the renovation project by the volunteer companies through Project Management Boards.

Table 16-Fire and Rescue Station Renovations

FIRE AND RESCUE STATION RENOVATIONS (\$22,560,000.00)									
	Adopted FY 2004	Adopted FY 2005	Adopted FY 2006	Estimated FY 2007	Estimated FY 2008	Estimated FY 2009	Estimated FY 2010	Six-Year Total	Project Total
Expenditures:									
Prof. Services	500	—	110	965	1,000	1,040	1,080	4,695	4,695
Construction	—	—	760	—	5,450	5,560	5,780	17,550	17,550
FF&E	—	—	—	—	100	105	110	315	315
Total Expenditures	500	—	870	965	6,550	6,705	6,970	22,560	22,560
Financing:									
Local tax funds	500	—	870	965	TBD	TBD	TBD	TBD	TBD
RLF	—	—	—	—	TBD	TBD	TBD	TBD	TBD
Lease-purchase	—	—	—	—	TBD	TBD	TBD	TBD	TBD
F&R Vol. Cos.	—	—	—	—	TBD	TBD	TBD	TBD	TBD
Total	500	—	870	965	6,550	6,705	6,970	22,560	22,560
TBD: To be determined (see note below).									
Note:									
The FY 06-FY 10 Adopted CIP projects general obligation bond financing for these renovation projects. For FYs 2007-FY 2010, it is likely that renovation projects will be financed through a combination of lease purchase bonds, local tax funds, land revolving loan funds. Financing will depend upon variables such as ownership, the ability to pay, and the ability to manage portions of the renovation project by the volunteer companies.									

20-Year Non-Station Needs Assessment

The twenty-year non-station facility needs assessment includes expansion of “existing program” space to include offices, classrooms, EOC, and ECC facilities. The plan also includes the development of “future program” space to include warehousing, fleet maintenance, training apparatus garaging, SCBA maintenance facilities and the construction of “training prop” facilities.

Table 17- 20-Year Estimated Non-Station Needs Assessment

20-Year Estimated Non-Station Needs Assessment

PROJECT DESCRIPTION	NET SQUARE FOOT REQUIREMENT	ESTIMATED CONSTRUCTION COST (FY05 \$)
1 Office/Program/Classroom Facilities w/parking	20,000 – 25,000 SF	\$5,000,000 – 6,250,000 (\$250/SF)
2 Permanent Emergency Operations Ctr (EOC)	8,000 – 10,000 SF	\$2,000,000 – 2,500,000 (\$250/SF)
3 Communications Center Expansion/Relocation	10,000 – 15,000 SF	\$3,500,000 – 5,250,000 (\$350/SF)
4 Warehouse/Central Supply Facility	10,000 – 20,000 SF	\$2,000,000 – 4,000,000 (\$200/SF)
5 Fleet Maintenance Facility	15,000 – 20,000 SF	\$4,875,000 – 6,500,000 (\$325/SF)
6 Burn Building Renovation (w/gas props)	-----	\$4,000,000 – 5,000,000
7 Field House/Garage Annex	8,000 – 10,000 SF	\$1,600,000 – 2,000,000 (\$200/SF)
8 MAZE/Forcible Entry/Sprinkler-Alarm Lab Bldg	7,000 – 8,000 SF	\$1,750,000 – 2,000,000 (\$250/SF)
9 SCBA Repair Shop	2,500 – 3,000 SF	\$500,000 – 600,000 (\$200/SF)
10 CPAT/Wellness-Testing Facility	8,000 SF	\$1,800,000 (\$225/SF)
11 Urban Rescue/Collapse Prop Lot	-----	\$1,500,000 – 1,950,000
12 Light Rail Prop Lot	-----	\$1,800,000 – 2,200,000
13 Utility Emergencies Prop Lot	-----	\$1,450,000 – 1,800,000
14 Haz-Mat/Chemical Prop Lot	-----	\$1,250,000 – 1,750,000
15 Mock Commercial Structure Burn Building	7,500 SF	\$1,875,000 (\$250/SF)
16 Flashover Simulator	-----	\$780,000 – 1,125,000

Table 18-20-Year Estimated Non-Station Needs Assessment Costs

20-Year Estimated Non-Station Needs Assessment Costs	
Project "Cost Center"	Estimated Cost (FY05 \$)
<i>Estimated "construction cost" for all program elements</i>	<i>\$35,680,000 – 46,600,000</i>
<i>Estimated "professional services" for all program elements (calculated @ 20% of construction)</i>	<i>\$7,135,000 – 9,300,000</i>
<i>Estimated "general site work" for all program elements (calculated @ 25% of construction)</i>	<i>\$8,920,000 – 11,650,000</i>
<i>Estimated "furnishings, fixtures, and equipment for all program elements (calculated @ 10% of construction)</i>	<i>\$3,568,000 – 4,660,000</i>

Impacts and Outcomes if adopted

By adopting the twenty year non-station facility needs standard, the combined fire and rescue service will have the resources available to continue training volunteer and career members in state of the art facilities utilizing state of the art equipment, facilities and training props. Additionally through adoption of the standard, the fire and rescue service will have the resources to operate a state of the art Emergency Operations Center (EOC), as well as expanding the current Emergency Communications Center (ECC). It is critical to the successful outcome of a natural or man-made disaster the Emergency Management plan be executed from a facility that contains state of the art planning and information technology infrastructure that is set-up and available 24/7. As well, to meet the projected increase in call volume the ECC will experience, expanded capabilities to handle this growth are essential for the successful dispatching and handling of emergency calls.

Vehicle/Apparatus Needs

Primary response vehicle (Engines/Ladders/Squads/Tankers/Ambulances/Brush Trucks) location is based on several factors. The demand for service (population--Capital Intensity Factor), and time and distance to travel to the emergency as it relates to response goals represents the driving forces for determining the placement and deployment of primary response vehicles.

Table 19-Fire and Rescue Apparatus Capital Intensity factor Criterion

Suburban Loudoun	Vehicle Type	Population Factor
Fire & Rescue	1500-gpm Engine	1:10,000 population
Fire & Rescue	ALS Ambulance	1:10,000 population
Fire & Rescue	Ladder Truck	1:25,000 population
Fire & Rescue	Heavy Rescue Squad	1:50,000 population
Rural Loudoun		
Fire & Rescue	1500-gpm Engine	1:10,000 population
Fire & Rescue	ALS Ambulance	1:10,000 population
Fire & Rescue	Tanker	1:10,000 population
Fire & Rescue	Brush Truck	1:10,000 population
Fire & Rescue	Heavy Rescue Squad	1:50,000 population
Fire & Rescue	Ladder Truck	1:25,000 population

Volunteer companies traditionally equip each station with two or more Engines (pumpers), and two or more Ambulances when they provide EMS service. Ladder Trucks, Heavy Squads, Tankers, and Brush Trucks are placed in companies as a single apparatus unit when the company provides these services.

The service plan recommends the County assist volunteer stations with the replacement of the following primary response vehicles (Table 20). The table applies to a company if the vehicle (Engine/Ladder etc.) is in service at that company, or is placed in the company for emergency response based on need (response distance) and/or the Capital Intensity Factor.

Table 20-Vehicle Replacement Table

Vehicle Type	Suburban Loudoun	Rural Loudoun
Engine-1500 gpm	1: each station	1: each station
Ladder Truck	1: each station	1: each station
Heavy Squad	1: each station	1: each station
Tanker		1: each station
Brush Truck		1: each station
Ambulance	2: each station	1: each station

Vehicle Replacement Standard

As the primary mission of fire and EMS vehicles is to deliver personnel and equipment to the customers, it is imperative these vehicles are maintained in a reliable working condition. Traditionally Engine (pumper) vehicles were retained in service up to fifteen years and Ladder Trucks up to twenty years. Although changes in technology in the fire apparatus industry have increased the service life for these apparatus, an increase in the responses to EMS and public service calls has escalated the emergency response wear and tear driving the service life in reverse. Additionally new technology and NFPA

safety recommendations make older apparatus obsolete, even though these apparatus may have a low wear and tear factor.

There is no national standard governing or making recommendation for the replacement of emergency vehicles. Volunteer departments in the County generally replace apparatus based on wear and tear, recurrent maintenance costs and active maintenance history, age of the apparatus, technology and safety changes, and available funding.

The service plan recommends the following replacement standard for emergency response fire and rescue apparatus (Table 21). The driving force in making these determinations is the time period the emergency vehicle is in service, and the advancement in Fire/EMS apparatus safety elements that occurs over this time period. Additionally as the County continues to grow, requests for service will continue to increase, impacting the wear and tear factor on these vehicles.

Table 21-Vehicle Replacement Guideline (years of service)

Apparatus Type	Front Line Service	Reserve Service
Engine (pumper)	12	5
Ladder Truck	15	5
Heavy Squad	15	5
Tanker	15	5
Brush Truck	15	5
Ambulance	5	3

Note: The Insurance Service Organization's (ISO) Fire Suppression Rating Schedule requires one spare Engine per eight required, and one spare ladder per eight required.

Currently assistance with vehicle replacement by the County occurs when requested by a volunteer company. Each request is prioritized based on the following criteria:

- Age of vehicle
- Company activity level
- Maintenance costs and maintenance history
- Vehicle reliability
- Personnel safety
- Vehicle use
- Funding availability. Is the company requesting:
 - 100% funding (hardship request)
 - 50% County-50% Company
 - 70% County-30% Company
 - 30% County-70% Company
- Total number of vehicle types currently in service within the company
- Capital Intensity Factor requirements
- Available funding in the current CIP budget cycle

Table 22-The vehicle replacement service level is comparable (years of service) to:

Locality	Engine	Ladder	Tanker	Heavy Squad	Ambulance
Henrico County, Virginia	Front Line: 12 Reserve: 3	Front Line: 15 Reserve: 5	20 years total	Front Line: 12 Reserve: 3	Front Line: 7 Reserve: 1
Chesterfield County, Virginia	Front Line: 20 Reserve: 5	Front Line: 20 Reserve: 5	Front Line: 20 Reserve: 5	Front Line: 20 Reserve: 5	Front Line: 7 Reserve: 5
Spotsylvania County, Virginia	Front Line: 12-18 170,000 miles	Front Line: 12-18 170,000 miles	Front Line: 12-15 170,000 miles	No report.	Front Line: 8-10 200,000 miles
Howard County, Maryland	Front Line: 10 Reserve: based on condition	Front Line: 15 Reserve: based on condition	Front Line: 15 Reserve: based on condition	Front Line: 15 Reserve: based on condition	Front Line: 5 Reserve: based on condition

The FY 06-FY 10 CIP Program has established a CIP project (Table 23) for the purchase of fire and rescue vehicles for the combined system through a Master Lease financing program. The Department in consultation with the volunteer companies, and utilizing the established criteria, identifies fire and rescue apparatus for purchase or replacement.

Table 23-Fire and Rescue Capital Vehicles Project Costs FY 06-FY 10

Capital \$ in thousands	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Future FYs	Project Total
Fire Vehicle Acquisition	2,165	3,000	3,000	3,000	3,000	0	14,165
Lease/Purchase	2,165	3,000	3,000	3,000	3,000	0	14,165
Total Financing	2,165	3,000	3,000	3,000	3,000	0	14,165

Table 24- FY 06 Capital Vehicle Acquisition Costs:

Apparatus Type	Company Placement	Proposed Cost
Engine (pumper)	Hamilton	425,000
Engine (pumper)	Neersville	425,000
Tanker	Round Hill	300,000
Tanker	Leesburg	300,000
Heavy Squad	Middleburg	500,000
Ambulance	Aldie	215,000
Total		2,165,000

Impacts and Outcomes if adopted

By adopting the vehicle replacement standard, emergency response apparatus and vehicles will be replaced utilizing a defined plan. By adopting a plan, the companies and the County will avoid the potential accumulation of an unreliable emergency vehicle fleet, and the associated effect on the CIP budget.

Operational/Administrative Needs

Respiratory Protection Program

The service plan recommends the establishment of a comprehensive county-wide respiratory protection plan administered by the Department to ensure full compliance with OSHA 29 CFR 1910.134. Presently the combined system **does not** have an integrated respiratory protection program, with the majority of the self-contained breathing apparatus (SCBA) units and air cylinders owned by the volunteer companies, and used by volunteer and career personnel alike. An inventory of SCBA units shows there are units either in disrepair or non-compliant with current standards.

Volunteer companies are increasingly challenged by changing community demographics, increased costs to remain operational, and decreased life-cycles for firefighting equipment produced by a rapidly growing demand for service. These factors have converged with a heightened recognition of critical gaps county-wide in personnel SCBA safety, leading to consent by Fire Advisory Council system stakeholders to consolidate procurement, maintenance, and testing of breathing apparatus under the department's umbrella of support services, and in accordance with a newly-formulated department respiratory protection plan.

As a direct result of this, and when funding allows, SCBA units owned by individual volunteer companies that are obsolete (with many manufactured before 1997), in poor repair or out-of-service, and/or incompatible with existing standards will be replaced with a current, up-to-date SCBA inventory. Additionally, through trained Department and volunteer members, units will be promptly and professionally maintained to a consistently satisfactory state of readiness through testing and service center maintenance care. Trained Department personnel will also perform annual member (career and volunteer) mask fit testing in accordance with the system respiratory protection plan.

High Operating Levels and Standards

The preferred high service level requires the replacement of:

125 SCBA units (complete)	Cost: \$500,000
55 SCBA cylinders	Cost: \$39,875

The high service level requires the purchase and implementation of:

2 Posi-Check flow test machine	Cost: \$16,500
2 Porta-Count Mask Fit Test machine	Cost: \$28,000

Annual cylinder hydro testing	Cost: \$5000
Annual SCBA repair parts/Masks	Cost: \$75,000

1-Program Manager: 1.07 FTE

** Current station personnel will serve as SCBA technicians as an ancillary duty

The high service standard will have a first year cost of \$763,004. Estimated second year costs will be \$149,987. Annual recurrent operating costs will have moderate increases as the system adds stations and companies (SCBA units), as well as personnel (SCBA masks).

To assist in first year funding, the department applied for a FEMA “Fire-Act” grant.

Federal grant funds: \$467,500.00

Local Tax Funds: \$116,875.00 (20% match)

Total grant: \$584,375.00

Impacts and Outcomes if adopted

The high standard if adopted will ensure system-wide compliance with 29 CFR 1910.134.

Medium (Current) Operating Levels and Standards

The medium service level continues current SCBA unit maintenance as follows:

- Volunteer companies maintain their SCBA inventory
- LCFR department maintains their SCBA inventory

The medium service level continues mask fit-testing through LCFR.

The medium service standard has an annual LCFR operating cost of \$23,000. Volunteer companies utilize annual contribution and donation funding for maintenance of their company SCBA program.

LCFR operating cost dependent on number of new Board approved FTE's.

Impacts and Outcomes if adopted

The medium service level if adopted does not ensure system-wide compliance with 29 CFR 1910.134. While mask fit-testing will continue through the department, maintenance of SCBA units, cylinders and masks will not be integrated as a system program.

Volunteer Recruitment and Retention

The recruitment of volunteer members into the combined system, and the retention of current volunteer members are critical elements in maintaining a healthy combined Fire and Rescue system.

An aggressive recruiting system includes comprehensive planning, development and implementation of recruitment strategies, follow-up to ensure strategies are effective, a centralized application process to be utilized as a coordination and measurement tool, and a coordinated monthly orientation program for new and prospective members.

Recruiting and retaining a force of volunteer members to meet operational staffing goals outlined in the staffing standards of this *Service Plan* will be a daunting task, given the changing demographics of the County's population. Success will require creative and committed efforts to reach targeted prospective members. Affiliation processes for potential members must be clear, accessible, and efficient; opportunities to obtain essential training must be frequent, flexible, and motivating; and company leadership must see nurturing and mentoring new members as a fundamental priority.

As the nature of fire-rescue work has appeal to those seeking an outlet for exciting and rewarding contributions to their community, it is physically demanding, and requires dedication and significant time allocation to complete necessary training. Targeting Loudoun's young adult population (17-22 year olds) through planned recruitment efforts holds particular promise. Understanding the motivators that appeal to this demographic group will be key in structuring recruitment programming that is successful. Implementing a "cadet" program in conjunction with local high schools, a Firefighter-EMT program through the C.S. Monroe Vocational-Technical Center, and actively recruiting at local colleges and young adult-market businesses will become primary recruiting strategies.

The retention of volunteer personnel requires follow-up with new and existing members to ensure the combined service is meeting their expectations, development of mentoring programs to ensure member success, acknowledgment of successes such as the completion of required certification courses, the monitoring of individual member system retirement points and benefits, and the analysis of reasons members are leaving the system. Additionally, retention of members will be key in ensuring a continuance of volunteer staffing. Initiatives that alleviate members from the burdens of other competing priorities and responsibilities, and that meaningfully recognize their contributions will be most effective.

The service plan recommends a Volunteer Recruitment and Retention Program Manager position be established in the department, as well as a Training Officer to provide management, coordination, and fire and EMS instruction to high school students at the C.S. Monroe Vocational-Technical Center.

Currently the recruitment and retention responsibility falls to a single staff member who is also tasked with OHA blood borne pathogen/infection control officer responsibilities, PPD and N-95 fit-testing for the combined system, as well as volunteer personnel record-keeping tasks.

High Operating Levels and Standards

The preferred staffing for the high service level is as follows:

- 1- Recruitment and Retention Program Manager. 1.07 FTE
- 1- Training Officer for C.S. Monroe Vocational-Technical Center program. 1.07 FTE

At the high standard, 1 Recruitment and Retention Program Manager and 1 Training Officer would be required at a total first year cost of \$149,372. Total second year cost of \$144,333.

Impacts and Outcomes if adopted

This adopted service level would allow the department to dedicate a staff member for the recruitment and retention of volunteer personnel. This staff person would work with the Volunteer Recruitment and Retention Committee to develop and implement recruitment strategies, as well as retention measures.

This service level is comparable to:

Henrico County, VA:	1 FTE
Chesterfield County, VA:	2 FTE
Howard County, MD:	0 FTE ³⁵

Medium (Current) Operating Levels and Standards

This service level combines the tasks of recruitment and retention of volunteer members with other non-related tasks (1.07 FTE).

No additional cost implication as this shared position is incorporated in existing departmental budget.

Impacts and Outcomes if adopted

The medium service level limits the capabilities of the volunteer recruitment and retention program. As new stations and services are placed in service, the demand for combined system staffing will increase. Additionally, volunteer service retention is an identified issue, as the system only netted nine (9) new members in FY 04. An increase in staffing (2.14 FTE) is recommended in order to meet the demands of the current retention issues, as well as current and future recruitment issues.

³⁵ Five member Fire & Rescue Board manages volunteer retention.

EMS Coordination and Support

Currently there are no established career positions for field-based EMS supervisory personnel (EMS Battalion Chief) within the combined system. EMS field supervisory personnel are critical components of the EMS system, as they not only provide patient-care oversight, but also serve as day-to-day liaisons with hospital staff and the OMD, system administrative and operational officers, and integrate into the Incident Management System on incidents involving multiple medical patients, technical rescue components, and as needed on other emergency incidents. Additionally, the EMS Battalion Chief (BC EMS) will ensure a day-to-day quality assurance/quality improvement program can be implemented.

The BC EMS will be responsible for the day-to-day field supervision and support of EMS operations in the County. The position is intended to be a supportive one in that the BC EMS should endeavor to monitor and mentor the active EMS providers as well as provide guidance and structure to on-going EMS operations countywide. While a member of the command rank, the BC EMS will not be disposed to assuming command unless that action is required to stabilize an evolving incident. The BC EMS is more appropriately oriented to assuming specific roles inside the Incident Command System (ICS) such as Medical, Medical Control, Treatment, Transport, Rehab, etc. Thus, the EMS BC shall be in a position to positively influence the patient treatment and improve patient outcome.

The BC EMS will be an on-duty point of contact for numerous groups whose operations closely interact with EMS, including local hospitals, regional ALS coordinators, Staff Duty Officer, Communications, other command rank officers, and the OMD.

The BC EMS will assist/promote appropriate training in the Fire/Rescue companies to address deficiencies in the system. The BC EMS will be a component of the Operational Medical Directors' quality assurance system, and should provide direct observation data to the OMD and the operations chiefs.

The service plans recommends the implementation of the Battalion Chief/EMS position through a combined effort of day staffing (6:00 AM-6:00PM) by career/volunteer personnel, and night staffing (6:00 PM-6:00 AM) by career/volunteer personnel.

High Operating Levels and Standards

The preferred staffing for the high service level is as follows:

A combined effort of day staffing (6:00 AM-6:00PM) by career/volunteer personnel, and night staffing (6:00 PM-6:00 AM) by volunteer/career personnel.

2 Career EMS Battalion Chief FTE's	2.24 FTE's
14 Volunteer personnel ³⁶	

³⁶ Volunteer personnel requirement based on one (1) twelve (12) hour shift every other week. Volunteer personnel will still be required to maintain individual company duty staffing requirements.

At the optimal standard, 2 EMS Battalion Chief's would be required at a total first year cost of \$303,215. Total second year cost of \$183,967.

Impacts and Outcomes if adopted

This adopted service level would allow the department to implement a day-to-day EMS field supervisory component into the combined system. EMS incidents account for 72% of the total emergency responses for the system. This supervisory component would act as the initial contact regarding EMS operational system issues, as well as provide leadership and supervision to new system EMS providers, assist duty crews with equipment and supply issues, liaison with the department's Senior Staff and the OMD, and provide direction and control regarding patient care on emergency incidents to ensure a successful pre-hospital patient outcome.

This service level is comparable to:

Henrico County, VA:	3 FTE
Chesterfield County, VA:	0 FTE
Howard County, MD:	6 FTE

Medium (Current) Operating Levels and Standards

The current service level provides no day-to-day system-wide EMS field supervision. EMS supervision is conducted on a station-by-station basis.

A program was approved (FRG 2.3.2) at the May 2005 Fire and Rescue Commission meeting. It is anticipated there may be adequate numbers of volunteer personnel to staff the position 100% during the night shift, and 15%-25% during the day shift.

Career Personnel:	0.00 FTE's
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Volunteer Personnel	14-16
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At the current standard, the total first year cost is \$98,541. Total second year cost of \$9,670.

Impacts and Outcomes if adopted

This adopted service level will allow the department to implement an EMS field supervisory component into the combined system, with staffing occurring predominately during the evening hours (6:00 P.M.-6:00 A.M.). An increase in staffing (2.24 FTE's) will allow the program to be implemented 24/7 to meet the demands of supervising a full service EMS division.

Fire Marshals Office

The Fire Marshal's Office (FMO) currently estimates there are 9,500 properties that are subject to regular fire prevention inspections. This number is projected to increase as residential development increases will serve as a catalyst to grow the development of additional business, mercantile, storage, and related commercial properties to support the growth in population. These additional commercial occupancies represent additional inspection demands on the FMO.

Adequate staffing to inspect existing commercial properties currently does not exist. Of the estimated 9500 inspectable properties, it is estimated by the FMO that staff will have the ability to complete 49-50% in FY05 and FY06. Current FMO staffing levels, as well as arson investigation, and explosive and hazardous device (EHD) response/inspection demands require the FMO to prioritize inspections. The prioritization of inspections includes those occupancies that represent a potential loss of life such as schools, institutions, places of public assembly, extremely hazardous facilities, and those occupancies in Section 109.3 of the Virginia Statewide Fire Prevention Code (VSFPC) that fall to the local Fire Marshal for annual inspection. Occupancies such as businesses and office properties, which generally represent property loss potential, may not receive regular fire safety inspections.

The growth in new construction continues to require fire prevention code enforcement staff action. Staff time includes site plan reviews (water supply for fire suppression use, access for fire suppression vehicles) and Freedom of Information (FOIA) requests (due diligence surveys and phase 1 environmental surveys). The regulation of commercial blasting is required under §27-96 of the Code of Virginia, as well as Chapter 33 of the VSFPC to be administered by the local Fire Marshal. The Fire Marshal's Office is involved in approximately 480 activities in this area per year, and includes permitting, explosive transport vehicle inspection, pre-blast conferences, site evaluations, and complaint investigations.

As required under the Code of Virginia §27-31, the Fire Marshal is responsible for the investigation of all reported fires and explosions. As population, housing, and commercial business increases, the investigation of fires, improvised explosive devices, and environmental offenses will also increase. It is estimated that 3,166 such investigations will be conducted in FY 05, with a slight increase projected for FY 06 due to population increase.

To keep pace with the growing workload of the FMO, the service plan recommends additional *non-uniform, civilian entry* inspector staffing in the fire prevention inspection division. The service plan also recommends the creation of a separate section residing in the FMO to administer explosives regulation, and response to incidents involving improvised explosives devices (IED'S). According to the County Fire Marshal, without auxiliary task demands such as arson investigation and IED responses, one inspector can reasonable complete 600-700 inspections per year. In addition to the recommended career staff, the *Service Plan* also recommends the recruitment of a limited number of volunteer inspectors to assist with routine inspections.

High Operating Levels and Standards

The preferred staffing for the high service level is as follows:

- 1-Deputy Chief (Fire Marshal)
- 1-Captain (Deputy Fire Marshal)
- 3-Lieutenants
- 4-Fire Investigators (24/7)
- 5-Assistant Fire Marshals (Inspections)
- 10-Civilian Inspection Personnel
- 2-Administrative Assistants

At the optimal standard 1 Assistant Fire Marshal FTE would be upgraded to Lieutenant, and the addition of 10 civilian inspection personnel and 1 administrative assistant would be required at a total first year cost of \$760,562. Total second year cost of \$574,131.

Impacts and Outcomes if adopted

This adopted service level will allow the FMO to meet the demands of the fire inspection section. The addition of ten civilian inspectors translates into 6000-7000 additional inspections completed per year. Additionally by creating a separate section to deal with explosive and blasting requests for service and inspections, the FMO can more efficiently enforce section §27-96 of the Code of Virginia through focused inspections, permitting, and follow-up. The additional administrative support position will provide staff assistance with the division permitting process, FOIA requests, information management of inspections, and support to the arson investigation section with reporting and court preparation.

This service level is comparable to:

Henrico County, VA:	10 FTE	1 FTE ³⁷ Administrative Support
Chesterfield County, VA:	15 FTE	3 FTE Administrative Support
Howard County, MD:	6 FTE	1 FTE Administrative Support

³⁷ Shared resource.

Medium (Current) Operating Levels and Standards

The current staffing level for the Fire Marshal's Office is:

1-Deputy Chief (Fire Marshal)
 1-Captain (Deputy Fire Marshal)
 2-Lieutenants
 4-Investigators (24/7)
 6-Assistant Fire Marshals
 1-Administrative Assistant

The cost for the current operating standard is:

Program Financial Summary	FY 02 Actual	FY 03 Actual	FY 04 Actual	FY 05 Adopted	FY 06 Adopted
Expenditures					
Personnel	\$982,034	\$947,947	\$1,073,062	\$1,222,000	\$1,281,000
Operations & Maintenance	244,793	186,565	173,083	229,000	242,000
Capital Outlay	6,758	8,800	8,800	65,000	65,000
Total Expenditures:	\$1,407,834	\$1,143,328	\$1,254,945	\$1,516,000	\$1,588,000
Revenue					
Local Fees, Charges, Etc	\$90,283	\$67,077	\$83,535	\$157,000	\$157,000
Total Revenues:	\$90,283	\$67,077	\$83,535	\$157,000	\$157,000
Local Tax Funding:	\$1,317,551	\$1,076,251	\$1,171,410	\$1,359,000	\$1,431,000
FTE Summary:	14.38	14.45	14.45	15.57	15.57

Impacts and Outcomes if adopted

This service level will maintain fire inspection rates at 49%-50% of inspectable properties. Additionally, inspection and investigative staff will continue to assist customers processing FOIA and due-diligence requests, as well as manage time between enforcement, investigative, and hazardous device inspections and responses.

Public Education

The public education program emphasizes community outreach and delivery of public education programs targeting County residents. Ongoing coordination of the department's child safety seat program, and creating effective partnerships with the school system, public safety agencies and other civic organizations are among the program's priorities. A balanced approach to program delivery integrates direct citizen contact, media releases and the development of a team of allied fire and life safety educators. The File-of-Life program, funded through a private-sector grant, assists the emergency management program in developing the A.F.T.E.R. team, which will aid organizations such as the American Red Cross in providing assistance to residents suffering fire loss. The department's role in facilitating community defibrillation programs and ensuring their seamless integration with community EMS resources will also continue to play an important role in this section's work program.

Public education activities include coordination of all fire and life safety public education initiatives, coordination of community-based training delivery, collaboration with other public and private sector partners in community safety education and support of activities such as station tours, citizen CPR classes and child safety seat inspections.

The delivery of public education must remain a priority for the department. As the population of the County increases, the demand for public education also will increase. Programs are directed at specific audiences such as children, senior citizens and community groups. Each group has special needs and thus must be evaluated appropriately in future plans for public education programs. It will be imperative for the department to continue to deliver this proactive means of fire and accident prevention. This function will become more critical as residents will demand to know more about safety and emergency procedures for all types of threats, including terrorism.

High Operating Levels and Standards

The preferred staffing for the high service level is as follows:

- 1-Public Education Manager
- 2-Public Education Specialists
- 1-Part-time administrative support position

At the optimal standard, the addition of 2 Public Education Specialists and 1 part-time administrative support position would be required at a total first year cost of \$174,626. Total second year cost of \$141,000.

Impacts and Outcomes if adopted

This adopted service level will provide an expanded scope of public education offerings to include reaching elementary-aged school children, implementation of a viable public access defibrillator (PAD) program, on-line fire and life safety education and activities, and more frequent “safe sitter” and related specialty programs – while ensuring cancellation of public education appointments due to field staff committed on emergency responses is minimized.

This service level is comparable to:

Henrico County, VA:	1.5 FTE
Chesterfield County, VA:	4 FTE
Howard County, MD:	2 FTE

Medium (Current) Operating Levels and Standards

The current staffing level for public education is:

1-Public Education Manager

Impacts and Outcomes if adopted

Provides limited scope of public education offerings, relying heavily on field staff to implement program delivery. The focus of the program will remain child safety seats, community CPR and Safe Sitter instruction, and limited PAD coordination.

Training

The training section supports a career and volunteer staff of more than 850 qualified firefighters and EMTs, as well as more than 150 certified advanced life support providers. The daily increase of large-scale corporate developments continues to present new fire fighting challenges requiring specialty training. Recurrent delivery of basic certification courses of three to six months duration each and specialized courses of varying duration see potential aggregate enrollment levels totaling more than 2,000 students per year. Repetition of key courses are required to ensure maintenance of adequate system staffing levels, as the average two year “service life” of a volunteer responder produces continuous turnover. Recruitment of qualified applicants to fill Board-authorized training positions has necessitated reassignment of field staff to meet essential course delivery requirements.

The primary client base for training is the internal member of the fire and rescue services. The population at large is the primary client base for public education efforts. The increase in the number of new career personnel, in recent fiscal years requiring the hiring of as many as nearly 50 employees, and the recruitment of additional volunteers directly impacts the program. Once personnel are initially trained, the programs must then change to provide continuing education for all active members.

In addition, the changing demographics of the County have a direct impact on the training program. Changes in demographics will impact the department by requiring additional training programs and skills to meet the changes in the County landscape, buildings, and in residents. This will require the department to implement new programs such as geriatric care, multi-lingual classes, high-rise fire fighting, etc.

Delivering training will continue to be a challenge for the department. The combination system requires that training be available during weekdays, weeknights and weekends. In order to have an effective volunteer system, all members must have training opportunities readily available. This requires that the same level of instruction be assigned to all members of the department. This places a tremendous demand on the training staff and will require staffing almost 16 hours per day, seven days per week in order to provide necessary training..

As volunteer system members find it increasing difficult to maintain required recertification training, means and methods will be implemented in FY06 to structure necessary “refresher” coursework more flexibly, to include distance learning strategies via the internet and full implementation of the department’s new Tanberg video conferencing system to permit training participation in their homes and stations.

The delivery of leadership and management training will continue to be a delivery challenge, as well as motivating personnel to attend this type of training. The Fire-Rescue Commission has established a workgroup to develop a uniform “company officer” training program, thereby ensuring that all officers – volunteer or career – are equally prepared to confidently perform incident management, as well as setting the stage for rank eligibility throughout the fire-rescue system.

Service delivery quality assurance among departmental staff through expanded in-station training/core skills verification is an important initiative that will need to be implemented.

The delivery of EMS training programs will place a new demand on the training division, and new and innovative methods must be explored to meet state standards and system needs. EMS training standards place a tremendous responsibility on this division in order to meet minimum training hours. Given the department's national accreditation as an EMT-Paramedic teaching institution, and the on-going shortage of certified advanced life support personnel available for recruitment within the region, heightened emphasis on recurrent and flexibly scheduled advanced medical training will be a priority.

Training policies and mandates come from the department, human resources and the Commonwealth of Virginia. The Virginia Department of Fire Programs develops training programs that must be adhered to in order to award state certification. The Virginia Department of Health establishes EMS training programs, and the Virginia Department of Labor mandates specific training programs in areas such as hazardous materials, confined space rescue, trench rescue, self contained breathing apparatus, etc. Even though volunteers do not fit the definition of an employee and thus are not directly covered by OSHA standards, the volunteer retirement system can be considered compensation and thus subjects all volunteers to all OSHA rules and regulations.

Regardless of this determination, all fire and rescue personnel should be awarded the same level of protection and training in areas that impact safety of other firefighters and EMS personnel. Training staff will likewise need to conduct federally mandated National Incident Management Systems (NIMS) training for all personnel.

Pending relocation to a new burn facility and high bay/tower building, the subsequent day-to-day maintenance and preparation of these facilities, props, and equipment for use during course delivery will be a challenging element of increased program activity.

Maximizing the training staff's focus on training delivery is challenged by the lack of dedicated administrative support to provide photocopying, data entry, files maintenance, and word processing in support of the program's efforts.

To ensure effective, even mandated student-to-faculty ratios during skills-based training exercises, a pool of part-time instructors is maintained and assigned, with an increasing reliance on their availability to keep pace with essential expansion of training program delivery.

Restructuring of existing staff roles would be necessary to designate an employee to coordinate in-station and distant learning initiatives, with another employee tasked with new curriculum development and records management duties for the Division. Restructuring existing division staff assignments would be challenging, given that existing staff are fully engaged in current course delivery.

High Operating Levels and Standards

The preferred staffing for the optimal service level is as follows:

1-Batalion Chief (Manager)
3-Captains (1-Recruit Training, 1-EMS Training, 1-Volunteer/Incumbent Career FF Training)
4-Lieutenants (1-Recruit Training, 1-EMS Training, 2-Volunteer/Incumbent Career FF Training)
10-Training Officers/Instructors (3-Recruit Training, 4-EMS Training, 3 Volunteer/Incumbent Career FF Training)
2-Support Technicians
1-Administrative Assistant

At the high standard, the addition of 2 Training Officers, 1 Support Technician, and 1 Administrative Assistant would be required at a total first year cost of \$265,900. Total second year cost of \$226,344.

Impacts and Outcomes if adopted

This service level provides an expanded scope of training program offerings to include company officer training, technical rescue courses (high angle rope, trench rescue, swift water rescue), distance learning course opportunities, and in-station continuing education. Training staff will be assigned to training program delivery in fire and EMS areas. This will increase the ability of the section to provide training days, nights and weekends in order to sustain the multitude of needs of a combination career and volunteer system.

This service level is comparable to:

Henrico County, VA:	8 FTE	1 FTE	Administrative Support
Chesterfield County, VA:	13 FTE	1 FTE	Administrative Support
Howard County, MD:	10 FTE	1 FTE	Administrative Support

Medium (Current) Operating Levels and Standards

The current staffing level for Training is:³⁸

1-Battalion Chief (Manager)
3 Captains
4-Lieutenants
8-Training Officers/Instructors

Impacts and Outcomes if adopted

This service level provides essential scope of traditional and mandated course offerings, utilizing reassigned field staff and current training program personnel.

³⁸ 9 positions assigned to the training division, 7 are reassigned from field services.

Planning and Administration

This section is responsible for all of the planning, Capital Improvement Program (CIP) project/procurement management, human resources (to include payroll and benefits), organizational development, purchasing, inventory management, administrative support, safety, and logistics for the department.

The role of this program is to support the operation of the department through the use of solid planning principles and management processes. The program works with all parts of the department and system-at-large to assure that County and department standards are being met, and that logistics “supply lines” are intact. A reassigned field services employee is solely responsible for all inventory and equipment/supply distribution to the department.

The primary client base for this program is internal members of Loudoun County. A secondary base involves vendors for all of the services and equipment that are purchased by Loudoun County. The internal clients include employees, the Chief, County administration, County purchasing, volunteers, the Fire and Rescue Commission and career applicants.

Human Resources must provide timely recruitment and hiring to fill vacancies and new positions totaling 60-80 each fiscal year, as well as promotional processes for Technicians, Lieutenants, Captains, Battalion Chiefs, and other vacancies. Pre-screening for a single firefighter/EMT recruitment can involve review of several hundred applicants, and hiring processes can range from simple interview to multiple component assessment centers. Steep competition for quality applicants will necessitate much enhanced recruitment efforts. Strategies to retain employees, given costly/timely investment in their training and impact of overtime costs to provide minimum operational staffing will shape on-going priorities. This program area will remain the department’s “hub” for ensuring H/R policy/procedure compliance and oversight of payroll and benefits – to include implementation of a new departmental pay plan. Safety goals include coordination of annual physicals, mask fit testing, and implementation of a system-wide respiratory protection program.

Planning tasks include review of all applications for new development/zoning changes, preparing referrals, and on-going coordination of existing and future CIP projects that currently include all new fire-rescue stations, renovation of 10-12 existing stations, expansion of the fire-rescue training center, and stewardship for capital vehicle procurements to establish expanded services, replace existing volunteer-owned vehicles, and establish a reserve fleet based on CIP planning detailed within this service plan. Additional CIP-related project management responsibilities include rural water supply tank placement, exhaust recovery system installations, lease/configuration of a decommissioned fire station for warehousing and supply distribution, and assistance to volunteer companies on related projects.

With a single employee responsible for all planning department referrals, much of the CIP project work must continue to be directly performed by a Deputy Chief that is responsible for management oversight of several other departmental programs. As projects advance, monitoring of construction progress, programming/procurement of furnishings, fixtures, and equipment to open new facilities, and coordination with stakeholders during building commissioning will be increasing difficult. Similarly, solicitation and procurement of capital vehicles to replace aging volunteer apparatus will add appreciably to the program's workload.

High Operating Levels and Standards

The preferred staffing for the optimal service level is as follows:

- 1-Deputy Chief
- 1-Battalion Chief (Human Resources)
- 1-Captain (Safety)
- 1-Administrative Manager
- 1-CIP Project/Facilities Manager
- 2-Human Resource Specialists
- 1-Budget Analyst
- 2-Administrative Assistant
- 2 Receptionists
- 1-Planner
- 1-Plans Referral/Reviewer
- 1-Commission Aide
- 2-Payroll Administrator
- 1-Buyer
- 1-Procurement Assistant
- 1-Records Clerk
- 1-Quartermaster
- 1-Supply/Inventory Specialists

At the high standard, the addition of 1 CIP Project/Facilities Manager, 1 Human Resource Specialists, 1 Budget Analyst, 1 Plans Referral/Reviewer, 1 Payroll Administrator, 1 Procurement Assistant, 1 Quartermaster, 1 Supply/Inventory Specialists, and 1 Administrative Assistant would be required at a total first year cost of \$587,528. Total second year cost of \$504,522.

Impacts and Outcomes if adopted

This service level if adopted will provide an expanded scope and improved timeliness and sophistication of all services, to include departmental strategic and service community analysis, enhanced recruitment, retention, and safety/wellness of personnel, CIP project management, and program-wide leadership. Additional support will be provided to building projects by the assignment of a project manager for station construction, renovation and maintenance, as assigned to the Planning and Administration Division.

This service level is comparable to:

Henrico County, VA:	15 FTE
Chesterfield County, VA:	22 FTE
Howard County, MD:	18 FTE

Medium (Current) Operating Levels and Standards

The current staffing level for Planning and Administration is:

- 1-Deputy Chief
- 1-Battalion Chief (Human Resources)
- 1-Captain (Safety)
- 1-Lieutenant
- 1-Administrative Manager
- 1-Administrative Assistant
- 2 Receptionists
- 1-Planner
- 1-Commission Aide
- 1-Payroll Administrator
- 1-Buyer
- 1-Records Clerk
- 1-Human Resource Specialists
- 1-Firefighter (Quartermaster)

Impacts and Outcomes if adopted

This service level provides essential, but limited scope of planning, project management, human resources, logistic and administrative support services, given on-going operational staff growth, utilizing reassigned field staff and current training program personnel.